

CHAPTER 4

Environmental Setting, Impacts and Mitigation Measures

Approach to the Analysis of Impacts

This chapter consists of 12 individual sections that describe the existing environmental setting and evaluate the environmental impacts of the proposed demolition of the Bevatron and the structure housing it, Building 51.

Scope of the Environmental Evaluation

In accordance with Appendix G of the CEQA Guidelines and the UC CEQA Handbook, the potential environmental effects of the proposed 2020 LRDP are analyzed for the following environmental issue areas:

- Aesthetics
- Air Quality
- Biological Resources
- Cultural Resources
- Geology, Seismicity and Soils
- Hazardous Materials
- Hydrology and Water Quality
- Land Use
- Noise
- Public Services
- Transportation and Traffic
- Utilities and Service System

Agricultural resources, population and housing, and mineral resources are discussed only in the Notice of Preparation (see Appendix A).

Format of Impact Analysis

Each of the 12 sections in this chapter includes a brief Introduction that describes the approach to the analysis of the topic at hand; a description of the existing Setting, including a discussion of existing physical conditions and of the regulatory environment for the issues under analysis; and an analysis of Impacts and Mitigation Measures.

The impacts analysis begins by setting for the relevant Significance Criteria by which impacts will be judged. In general, these criteria are derived from Appendix G of the state CEQA Guidelines and from the UC CEQA Handbook. Because this is a *tiered* EIR (that is, the analyses are founded upon the analysis in the Lab's 1987 LRDP EIR, as amended), the impacts discussion next presents a summary of relevant impacts anticipated and analyzed in the programmatic LRDP EIR, as amended, as well as mitigation measures from the LRDP EIR, as amended. The impacts analysis then analyzes project-specific impacts of the demolition of the Bevatron and Building 51 and, where impacts are found to be significant, presents mitigation measures specifically applicable to those impacts. Each section concludes with an analysis of cumulative impacts (see separate discussion below), a summary of the impacts and mitigation measures, and references.

Cumulative Impact Analysis

CEQA Guidelines Section 15130 requires an EIR to discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable; that is, when the incremental effects of the individual project "are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects" (CEQA Guidelines Sec. 15065(a)(3)). In general, the discussion of cumulative impacts need not be as exhaustive as the analysis of project impacts.

Key factors in the analysis of cumulative impacts include the following:

- If cumulative impacts are not significant, the EIR should briefly explain why this is the case. (Guidelines Sec. 15130(a)(2))
- There can exist a significant cumulative impact, but a project's contribution to that cumulative significant impact may be found to be "less than cumulatively considerable" and, therefore, not significant "if the project is required to implement or fund its fair share of a mitigation measure or measures designed to alleviate the cumulative impact." (Guidelines Sec. 15130(a)(3))
- The cumulative impacts analysis may be based upon a list of other projects that could, in conjunction with the proposed project, result in cumulative impacts; alternatively, the analysis may be based upon a summary of growth projections in a general plan or similar document. (Guidelines Sec. 15130(b)(1))
- The geographic context of cumulative impacts analysis will likely vary between environmental topics. For example, cumulative aesthetic impacts will likely include the effects of projects that can be viewed from a particular vantage point, while cumulative water quality impacts may extend to an entire watershed and cumulative air quality impacts may extend over an entire region where airborne pollutants can interact (for example, the Bay Area). (Guidelines Sec. 15130(b)(2),(3))

While the geographic contexts for cumulative environmental impacts may differ by type of impact, the analyses in sections IV.A through IV.L share several basic underlying assumptions,

including that all future development at LBNL will be consistent with the 1987 LRDP and LRDP EIR, as amended, or with the 2006 LBNL Long Range Development Plan and its accompanying LRDP EIR currently under preparation, and would incorporate any relevant mitigation measures. Development anticipated by the City of Berkeley's General Plan and by UC Berkeley's LRDP is also assumed. As described in more detail in Chapter VI, the following planned, pending, and/or reasonably foreseeable activities assumed in the cumulative analysis include the following LBNL projects: rehabilitation of Buildings 77 and 77A; Resource Conservation and Recovery Act (RCRA) Corrective Measures Implementation (CMI) in accordance with the Lab's state Department of Toxic Substances Control permit; construction and operation of an Animal Care Facility; and a security upgrade of the Blackberry Gate. Specific anticipated projects at UC Berkeley assumed in the cumulative analysis include the following: construction of an Early Childhood Education Center (child care facility) on Haste Street; completion of the new Stanley Biosciences and Bioengineering Facility on the UC Berkeley campus; replacement of Davis Hall North with a new Center for Information Technology Research in the Interest of Society; seismic retrofit of Bancroft Library; and construction of a pedestrian bridge over Hearst Avenue east of Gayley Road to connect two Foothill dormitories and provide access between the dormitories and campus.

A. Aesthetics

Introduction

This section discusses existing visual conditions at the Building 51 site and analyzes the potential for the project to affect those conditions, focusing on the visual character of the site and views from surrounding public areas. The physical characteristics of the site and surrounding areas are discussed briefly. For additional description of the land uses mentioned below, refer to Section IV.H, Land Use and Planning.

Setting

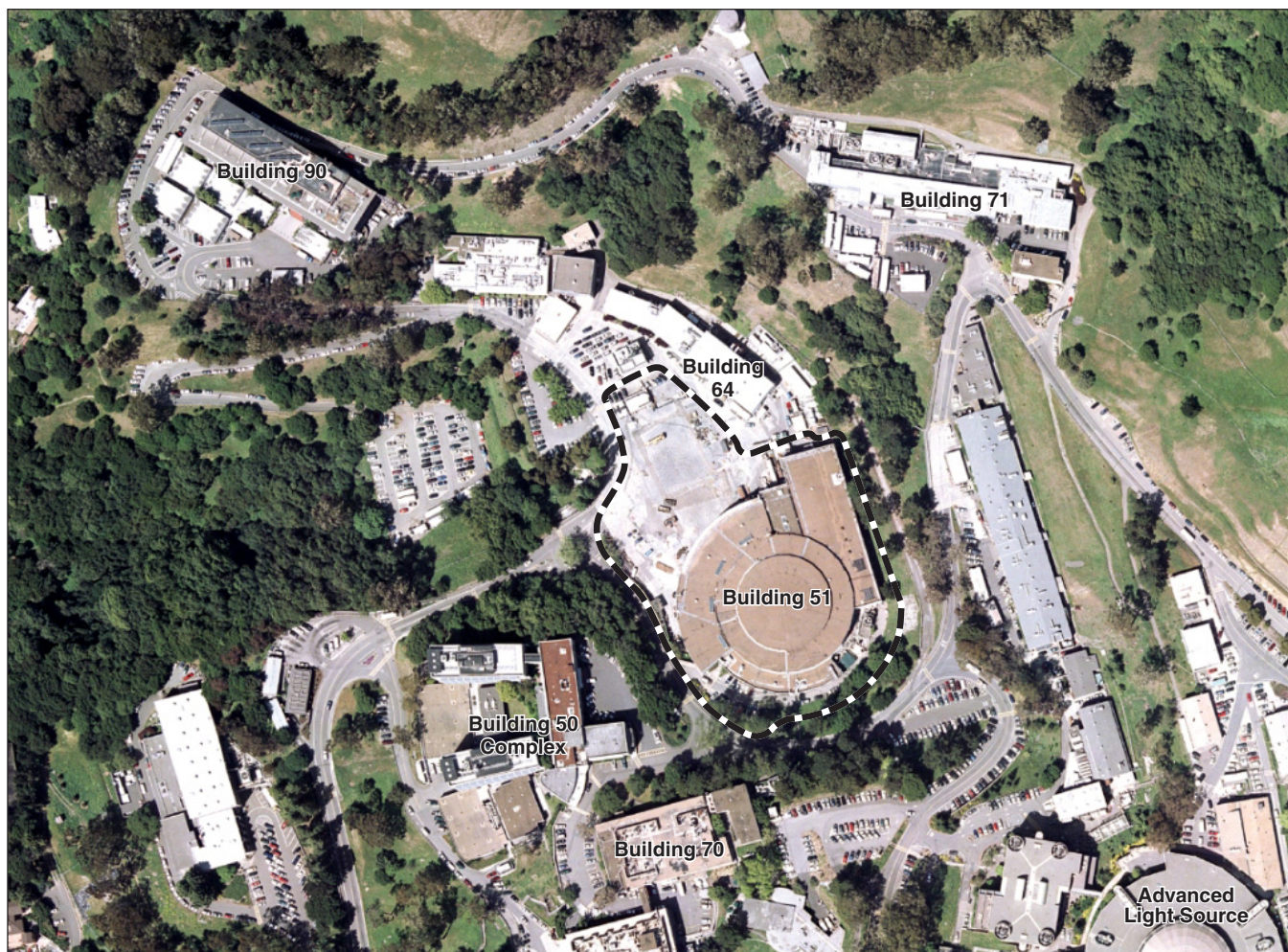
Visual Character

Vicinity of Site

LBNL is located on approximately 200 acres in the eastern hills of Berkeley and Oakland. It is surrounded by open space, institutional uses, and residential and neighborhood commercial areas. The project site is located entirely within the City of Berkeley. South and east of the Lab is the University of California, Berkeley campus, characterized by a variety of buildings, open space, student parking areas, and mature landscaping. The stadium and other University buildings are located farther southeast. To the west and north of the Lab are residential neighborhoods and a small commercial area located in the City of Berkeley. The residential neighborhoods are characteristically a mix of single- and multiple-family homes, some small retail uses, and a variety of local, landscaped roadways. Some of the homes closest to the Lab are tucked into the lower reaches of the hillside, while others are situated atop the higher ridges, and therefore have an unimpeded panoramic view of the Lab and its environs. Building 51 is approximately 1,100 feet from the nearest residences to the west and north, and about 1,300 to 1,400 feet from the Lawrence Hall of Science to the east. Farther away and to the northeast of the site are Tilden and Claremont Canyon Regional Parks. These large open space areas are heavily vegetated with eucalyptus, oak, and other herbaceous species, and include numerous paved and unpaved recreational trails, open field areas, and a variety of public amenities.

Project Site

As described earlier, the project site is approximately four acres, including parking and staging areas. Approximately 2.25 acres of the project site (the "demolition zone") would be converted from developed area (i.e., occupied by Building 51) to an undeveloped area for an indeterminate time, until another use for the site is proposed, approved, and initiated. The site is located adjacent to Lawrence Road and McMillan Road within Berkeley Lab, and is generally flat. As shown in **Figure IV.A-1**, an aerial view of Building 51, the project site is surrounded by parking lots, other LBNL research structures, landscaping, and roadways. The character of the immediate area is highly urbanized and developed as an institutional facility. Parks and other open spaces are located beyond the perimeter of LBNL, but do not define the character of the site.



--- Project Boundary



SOURCE: LBNL (2005)

Demolition of Building 51 and the Bevatron / 204442 ■

Figure IV.A-1
Aerial Photograph of the Project Site

Views of the Site

Views of the vicinity of the project site are available from long-, medium-, and short-range distances, although, due to topography, other buildings, and the presence of many large trees, Building 51 is generally not visible from publicly accessible long-range views of LBNL.

As shown in **Figure IV.A-2** (Viewpoint 1), the LBNL complex is visible in long-range views when looking east from University Avenue at the intersection with San Pablo Avenue. However, Building 51 is obscured by hillside vegetation and is not visible from this location.

As shown in **Figure IV.A-3** (Viewpoint 2), the LBNL complex is visible in other long-range views when looking east from Hearst Avenue at the intersection with Shattuck Avenue. However, Building 51 is obscured from view by the Building 50 Complex, which is situated in front of (to the west of) the project site.

As shown in **Figure IV.A-4** (Viewpoint 3), Building 51 is visible in medium-range views from the Lawrence Hall of Science north parking lot when looking southwest. The circular rooftop of Building 51 is visible in the center of the frame. This view is also characterized by other LBNL buildings such as the Advanced Light Source (ALS) building to the left of the frame, hillside vegetation, and the city of Berkeley and San Francisco Bay beyond. Also visible slightly to the right of the Building 51 rooftop is Building 51B, which has since been demolished and is currently a paved area.

Figure IV.A-5 (Viewpoint 4) depicts Building 51 from a northwest point within the LBNL site, looking southeast. Building 51 is visible in the mid-ground, with the location of the now-demolished Building 51B in the foreground (the large outdoor area, currently used for equipment staging, storage, and parking). The ALS building is prominent on the ridgetop at the center rear of the photo.

Short-range views of Building 51 are available primarily from the immediate roadways within LBNL, such as from Cyclotron Road and Lawrence Road. From these distances, the building complex appears as a fully developed institutional facility (see **Figure IV.A-6**, Viewpoint 5).

Cedar Street and Dwight Way are identified as view corridors in the City of Berkeley General Plan. The project would not alter views from these corridors, and therefore, they are not discussed further.

Light and Glare

The existing sources of light and glare at the project site are generally limited to the interior and exterior lights of Building 51. Other sources of light include interior and exterior lighting associated with adjacent buildings, parking lots, and access roads. All on-site buildings and parking areas are currently equipped with outdoor, downward-directed light fixtures for nighttime lighting and security. In addition, the cars and trucks traveling to and from the site represent



SOURCES: LBNL (2005) and ESA (2005)

Demolition of Building 51 and the Bevatron / 204442 ■

Figure IV.A-2

Viewpoint 1,
Existing View from San Pablo Avenue
at University Avenue



Demolition of Building 51 and the Bevatron / 204442 ■

SOURCES: LBNL (2005) and ESA (2005)

Figure IV.A-3
Viewpoint 2,
Existing View from Hearst Avenue
at Shattuck Avenue

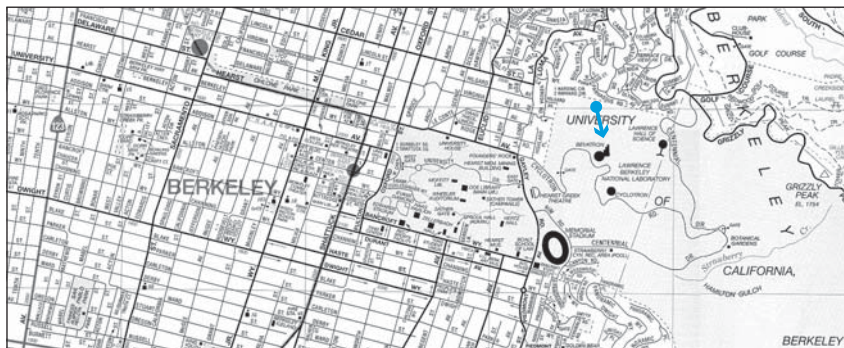
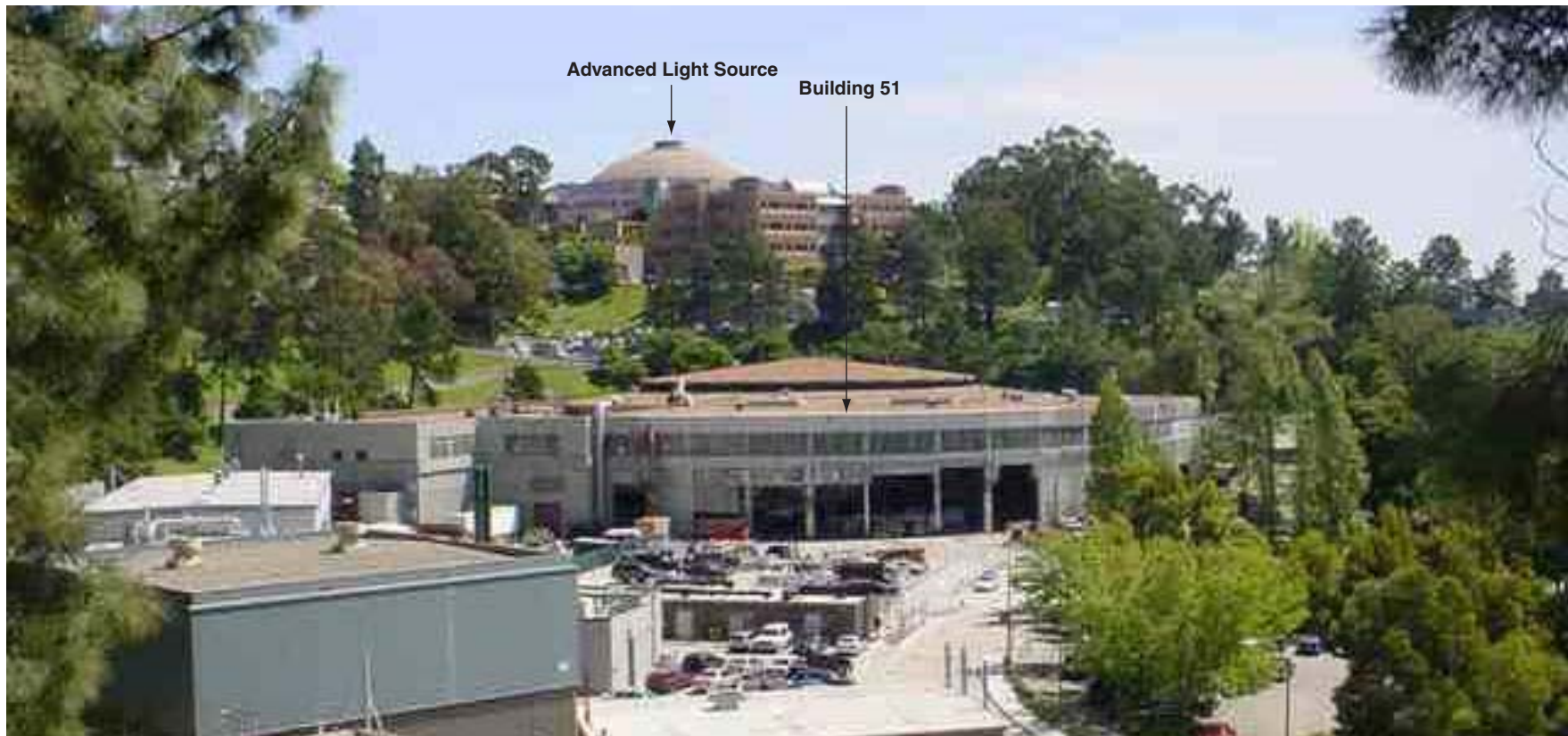


SOURCES: LBNL (2005) and ESA (2005)

Demolition of Building 51 and the Bevatron / 204442 ■

Figure IV.A-4

Viewpoint 3,
Existing View from Lawrence Hall
of Science North Parking Area



SOURCES: LBNL (2005) and ESA (2005)

Demolition of Building 51 and the Bevatron / 204442 ■

Figure IV.A-5

Viewpoint 4,
Existing View Near LBNL Building 90



SOURCES: LBNL (2005) and ESA (2005)

Demolition of Building 51 and the Bevatron / 204442 ■

Figure IV.A-6

Viewpoint 5,
Existing View from Lawrence Road
Southwest of Building 51

sources of glare. The project site is located near internal LBNL roadways such as Cyclotron Road, Alvarez Road, Lawrence Road, and McMillan Road, where street lighting results in light and glare during evening hours.

Regulatory Environment

1987 LBNL Long Range Development Plan (LRDP)

The 1987 LBNL Long Range Development Plan designates the perimeter of the Laboratory, covering the area between the LBNL fence line and the central development core, as open space that preserves the natural beauty of the area and acts as a buffer between LBNL and the UC campus, nearby residential areas, the Lawrence Hall of Science, and the UC Botanical Garden. These natural buffer areas are managed with the following objectives:

- Maintain aesthetic and environmental values;
- Stabilize slopes and manage rainwater runoff;
- Reduce fire hazards; and
- Visually screen facilities, roadways and parking areas.

Landscape planting areas are established throughout the Laboratory grounds to sustain or augment the shrub, grassland, and forest areas of the Lab. Major landscaping goals are to:

- Complement the hillside setting;
- Unify the site visually;
- Relate the site to adjacent vegetation of the Berkeley Hills;
- Prevent erosion;
- Provide amenities to users of the site; and,
- Provide a buffer between functional areas, buildings, and adjacent properties.

The 1987 LRDP also includes Design Guidelines that were developed to achieve specific facilities planning requirements while respecting site constraints and providing coherence among building elements and the landscape. The guidelines provide a general framework for facilities design and are intended to be augmented by more detailed landscape plans that identify criteria for suitable building sites and that further clarify landscape planting form. The guidelines generally address open space and outlooks, landscaping and visual enhancement, topography and grading, utilities corridors, building mass and orientation, building exteriors, building flexibility, energy and operational efficiency, and circulation and parking. The guidelines also provide a review process for future development on-site.

City of Berkeley General Plan

As a federal facility conducting work within the University of California's mission, LBNL is generally exempt under the federal and state constitutions from compliance with local requirements. However, LBNL seeks to cooperate with local jurisdictions to reduce the physical consequences of its activities to the extent feasible. The Urban Design and Preservation Element

of the City of Berkeley General Plan policies that potentially pertain to the proposed project include:

- Policy UD-31 Views: Construction should avoid blocking significant views, especially ones toward the Bay, the hills, and significant landmarks such as the Campanile, Golden Gate Bridge, and Alcatraz Island. Whenever possible, new buildings should enhance a vista or punctuate or clarify the urban pattern. (City of Berkeley, 2001).

Impacts and Mitigation Measures

Significance Criteria

As more fully described in the 1987 LRDP EIR, as amended, potential impacts on visual quality could result from continued University operation of LBNL, including continued facility development as contemplated in the 1987 LRDP.

The existing visual character of the site and its surroundings is determined by the attributes of specific features and of the patterns the features have assumed as a result of natural and/or cultural processes. Evaluation of potential project impacts on the visual character of the site and surroundings requires analysis of the individual elements of the project and how introduction of those elements (separately or collectively) would affect the character of the proposed site and views of the site from off-site locations.

An impact of an LBNL project on visual quality would be considered significant if it would exceed the following standards of significance, in accordance with Appendix G of the state CEQA Guidelines and the UC CEQA Handbook:

- Have a substantial adverse effect on a scenic vista;
- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;
- Substantially degrade the existing visual character or quality of the site and its surroundings;
- Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area; or
- Exceed an applicable LRDP or Program EIR standard of significance.

The Initial Study (see Appendix A) found that no on-site resources are within or in the vicinity of a state scenic highway. This topic is therefore not discussed further in this section.

Measures Included as Part of the Project

The following impacts relevant to visual quality and aesthetics have been anticipated and analyzed pursuant to CEQA as part of the programmatic 1987 LRDP EIR, as amended, from which this analysis is tiered:

Impact III-F-1:	Continued implementation of the 1987 LRDP will result in a change in the visual quality of LBNL and the surrounding environs.
Impact III-D-2:	Continued University operation of LBNL, including continued implementation of the LRDP, will result in the loss of some vegetation, including potential loss of mature trees and areas with some habitat for non-critical species.
Cumulative Impacts:	Cumulative development in the LBNL/UC Berkeley hillside area is not expected to have a significant impact upon visual quality.

As a result of anticipated impacts to visual quality, the following mitigation measure, adopted as part of the 1987 LRDP EIR, as amended, is already required for the proposed project, and is therefore incorporated as part of the proposed project's description:

Mitigation Measure III-D-2a:	Revegetation of disturbed areas, including slope stabilization sites, using native shrubs, trees, and grasses will be included as part of all new projects.
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Impacts

Impact IV.A-1: Demolition activities associated with the proposed project, and the removal of Building 51 itself, would result in changes to the visual quality of the site and its surroundings. (Less than Significant)

Demolition activities, described in detail in Chapter III, Project Description, would create a temporary adverse effect on the visual quality of the project site and its surroundings. The visual environment during the demolition project, which would last between four years and seven years, would include the presence of elements typical of a demolition site such as cranes, excavators, loaders, trucks, compactors, stockpiled materiel, and temporary fencing, as well as the truck trips necessary to bring materials to and from the site. After demolition activities have been completed, the site would be backfilled, compacted, and hydroseeded. While future reuse of the site is contemplated by LBNL, no specific project has been identified to date, and for the purpose of this analysis, no buildings would exist on the site after the demolition project is completed. In accordance with 1987 LRDP EIR, as amended, Mitigation Measure III-D-2a, disturbed areas would be revegetated using native shrubs, trees, and/or grasses. All vegetation placed by the proposed project would be irrigated as necessary and would conform to the 1987 LRDP Design Guidelines.

Views of the project site and of demolition activities would be primarily available from locations immediately surrounding the building, on LBNL property, with some portions of the site visible from the Lawrence Hall of Science when looking west. The visual environment created during demolition activities would be temporary and therefore its impact on views would be less than significant. As discussed above, no long-range views of the project site would be altered, as the project site is generally not visible from longer distances within the city of Berkeley.

Removal of the Bevatron and Building 51 would alter the character of the site by replacing a large building complex with an open, revegetated area of about 2.25 acres in size; however, this alteration would not create an adverse aesthetic impact.

Mitigation: None additional required.

Impact IV.A-2: The project could potentially increase the amount of light and glare emitted from the project site. (Less than Significant)

If nighttime demolition activities were to occur, additional temporary lighting would be required that could affect views by increasing the amount of light and glare emitted from the project site. Work would be performed approximately 40 hours per week, Monday through Friday. Normal work hours would be between 7:00 a.m. and 3:30 p.m. However, as stated in the Project Description, if it would be necessary to perform some work activity after sunset or before sunrise, such as truck loading and departure, or to complete a critical phase of work that would not cause significant noise or other impacts, the Lab would install night shields on all outdoor fixtures used during demolition activities to minimize potential light and glare spillover impacts. This nighttime lighting would not be a substantial new source of light or glare visible to off-site urban areas. As these actions would ensure conformance with the current LRDP Design Guidelines as well as compatibility with surrounding land uses, the proposed project would not result in a significant new source of light or glare.

Mitigation: None additional required.

Cumulative Impacts

Impact IV.A-3: The project could potentially contribute considerably to a significant cumulative aesthetic impact. (Less than Significant)

The temporary visual effects of the proposed project described in Impact IV.A.1 would make no cumulatively considerable contribution to adverse visual impacts at LBNL or in Berkeley. The project's temporary visual effects would be within the scope of the 1987 LRDP EIR, as amended, which concluded that the overall development of approximately two million gross square feet of facilities at LBNL would not adversely affect the visual quality of the area.

As stated in Chapter III, Project Description, development of the site is likely at some point in the future, although there are no firm plans for such development that have reached the level of a proposed or reasonably foreseeable action. Given the absence of a development proposal, and given that the new LRDP and LRDP EIR now under preparation are not anticipated to include any specific development proposal for the Building 51 site, it would be speculative at this time to

provide detailed analysis. However, it is anticipated that future development would be consistent with the 1987 LRDP and 1987 LRDP EIR, as amended, or, depending on when development would be proposed, with the new LRDP and LRDP EIR. Future development would be evaluated and documented in accordance with CEQA requirements, and would incorporate applicable mitigation measures.¹ A future project also would comply with applicable governmental requirements that result in the avoidance or reduction of potential environmental impacts. Any such project would be required to be consistent with the governing LRDP absent an LRDP amendment. Similarly, development at UC Berkeley and other locations in the vicinity also is anticipated to comply with applicable requirements (e.g., in the case of UC Berkeley, with its own 2020 LRDP and LRDP EIR, issued in 2005). Thus, a future project at the Building 51 site would not be expected to contribute considerably to a cumulatively significant impact.

Mitigation: None additional required.

Summary of Impacts and Mitigation Measures

The proposed project would not exceed applicable standards of significance and would result in no significant impacts related to aesthetics. The project would incorporate Mitigation Measure III-D-2a from the 1987 LRDP EIR, as amended.

Building 51 Demolition Project-Specific Mitigation Measures: None required.

References –Aesthetics

City of Berkeley, *City of Berkeley General Plan: A Guide for Public Decision-Making*, 2001.

¹ For example, mitigation measures relevant to aesthetics in the 1987 LRDP EIR as amended, include:

III-F-1a: Buildings will occupy as limited a footprint as feasible. They will incorporate features that enhance flexibility and future versatility.

III-F-1b: Buildings will be planned to blend with their surroundings and be appropriately landscaped. Planning objectives will be for new buildings to retain and enhance long distance view corridors and not to compromise views from existing buildings. New buildings will generally be of low rise construction.

III-F-2: Any new facilities will not use reflective exterior wall materials or reflective glass, to mitigate the potential impacts of light and glare.

III-D-2a: Revegetation of disturbed areas, including slope stabilization sites, using native shrubs, trees, and grasses will be included as part of all new projects.

B. Air Quality

Introduction

This section discusses existing air quality conditions in the project area and the regulatory framework for air quality management. It also analyzes the types and quantities of air emissions that would be generated on a temporary basis due to demolition of Building 51 and associated structures, as well as the potential effects of these emissions on existing local and regional air quality.

Setting

Air quality is affected by the rate, amount, and location of pollutant emissions and by local meteorological conditions that influence pollutant movement and dispersal. Atmospheric conditions, including wind speed, wind direction, air temperature, and atmospheric stability, in combination with local surface topography (e.g., geographic features such as mountains and valleys and structural features such as buildings), determine the effect of air pollutant emissions on local air quality.

Climate and Meteorology

The project site is located in the city of Berkeley and is within the boundaries of the San Francisco Bay Area Air Basin (Bay Area). Storm tracks typically stay north of the Bay Area for much of the year. Berkeley's proximity to the Pacific Ocean also contributes to its moderate climate.

The annual temperature at Berkeley Lab averages in the mid 50s (degrees Fahrenheit). Low temperatures during winter months seldom drop below the mid 30s, while the warmest days of the summer infrequently see high temperatures that exceed 80 degrees Fahrenheit. Daily and seasonal oscillations of temperature are small because of the moderating effects of the nearby ocean. In contrast, rainfall generally tends to be confined to the period from early November through late April or early May. On average, Berkeley Lab receives about 30 inches of rainfall annually. The annual total can vary considerably, depending on climatic conditions, such as drought. Winds in the Berkeley area display several characteristic patterns. During the day, especially under fair weather conditions, winds are typically from the west and northwest as air comes in off the Pacific Ocean. At night, cooling of the land generates winds from the east and southeast. Southeast winds typically also precede weather systems passing through the region.

Regulatory Environment

Criteria Air Pollutants

The federal Clean Air Act of 1970 and its amendments established maximum allowable concentration standards for six ambient air pollutants known as "criteria" pollutants: ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter (respirable PM₁₀ and fine

PM_{2.5}), and lead. These ambient air quality standards for each pollutant are shown in **Table IV.B-1**, which also lists their related health effects and principal sources. Each of these standards was set to meet specific public health and welfare criteria. Individual states were given the option to adopt more stringent state standards for criteria pollutants and to include other pollutants. California has done so through the California Clean Air Act.

Both the federal and California Clean Air Acts also require that air basins, or portions thereof, be classified as either “attainment” or “nonattainment” for each criteria air pollutant, based on whether or not the federal and state standards have been achieved. Nonattainment areas are required to prepare air quality plans that include strategies for achieving attainment. Maintenance plans are required for attainment areas that had previously been designated nonattainment in order to ensure the continued maintenance of the standards. Air quality plans developed to meet federal requirements are referred to as State Implementation Plans (SIPs). Air quality plans are required to address all nonattainment issues except the state PM_{2.5} and PM₁₀ standards.

Toxic Air Contaminants (Diesel Particulate Matter)

Toxic air contaminants are air pollutants that may cause or contribute to an increase in mortality or an increase in serious illness, or may pose a present or potential hazard to human health. The California Air Resources Board (CARB), California’s air quality management agency, recognizes hundreds of substances as toxic air contaminants. While some other toxic air contaminants (TACs) could be expected to be present at the site or could be used in the proposed demolition, the potential hazard from these TACs would be much smaller than the potential hazard from the particulate emissions from diesel-fueled engines of the demolition equipment and haul trucks. CARB identified these diesel particulates, referred to as diesel particulate matter or DPM, as a toxic air contaminant in August 1998 (CARB, 2005c). For this reason, it is sufficient to consider DPM alone in determining impact.

The central issue of concern with DPM is the risk of chronic health effects associated with long-term exposure to these particulates. To address this risk, CARB developed a risk management guidance document and risk reduction plan to reduce DPM and resultant health risk by 75 percent in 2010 and 85 percent by 2020. Since approval of these documents in September 2000, CARB has adopted a series of rules for stationary and portable diesel engines, solid waste collection vehicles, transport refrigeration units, and idling of diesel vehicles. Additional measures and specific regulations to reduce DPM emissions will be evaluated and developed over the next several years. In addition, in May 2004, the U.S. Environmental Protection Agency (EPA) adopted a comprehensive national program known as the Clean Air Nonroad Diesel Rule to reduce emissions from future nonroad diesel engines by more than 90 percent by integrating engine and fuel controls (EPA, 2004). Standards for new engines will be phased in beginning in 2008. Likewise, the new rule will cut the sulfur content of diesel fuel from the current 3,000 parts per million (ppm) to 500 ppm in 2007 and 15 ppm by 2010.

TABLE IV.B-1

STATE AND FEDERAL CRITERIA AIR POLLUTANT STANDARDS, EFFECTS, AND MAJOR SOURCES

Pollutant	Averaging Time	State Standard	Federal Standard	Pollutant Health and Atmospheric Effects	Major Pollutant Sources
Ozone	1 hour 8 hour	0.09 ppm 0.07 ppm	-- 0.08 ppm	High concentrations can directly affect lungs, causing irritation. Long-term exposure may cause damage to lung tissue.	Formed when reactive organic gases (ROG) and nitrogen oxides (NO _x) react in the presence of sunlight. Major sources include on-road motor vehicles, solvent evaporation, and commercial/industrial mobile equipment.
Carbon Monoxide	1 hour 8 hour	20 ppm 9 ppm	35 ppm 9 ppm	Classified as a chemical asphyxiant, carbon monoxide interferes with the transfer of fresh oxygen to the blood and deprives sensitive tissues of oxygen.	Internal combustion engines, primarily gasoline-powered motor vehicles.
Nitrogen Dioxide	1 hour Annual average	0.25 ppm ---	--- 0.053 ppm	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown.	Motor vehicles, petroleum refining operations, industrial sources, aircraft, ships, and railroads.
Sulfur Dioxide	1 hour 24 hour Annual average	0.25 ppm 0.04 ppm ---	--- 0.14 ppm 0.03 ppm	Irritates upper respiratory tract; injurious to lung tissue. Can yellow the leaves of plants; is destructive to marble, iron, and steel. Limits visibility and reduces sunlight.	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
Respirable Particulate Matter (PM ₁₀)	24 hour Annual average	50 µg/m ³ 20 µg/m ³	150 µg/m ³ 50 µg/m ³	May cause irritation to eyes and respiratory tract, decreases in lung capacity, cancer, and increased mortality. Produces haze and limits visibility.	Dust- and fume-producing industrial and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays).
Fine Particulate Matter (PM _{2.5})	24 hour Annual average	--- 12 µg/m ³	65 µg/m ³ 15.0 µg/m ³	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and results in surface soiling.	Fuel combustion in motor vehicles, equipment, and industrial sources; residential and agricultural burning. Also formed from photochemical reactions of other pollutants, including nitrogen oxides, sulfur oxides, and organics.
Lead	30-day average Calendar quarter	1.5 µg/m ³ ---	--- 1.5 µg/m ³	Disturbs gastrointestinal system and causes anemia, kidney disease, and neuromuscular and neurologic dysfunction.	Lead smelters, battery manufacturing and recycling facilities.

NOTE: ppm = parts per million; µg/m³ = micrograms per cubic meter.

SOURCE: CARB, *Ambient Air Quality Standards*, <http://www.arb.ca.gov/aqs/aqs2.pdf>, June 9, 2003, accessed January 31, 2005b.

Regulatory Agencies

The EPA is responsible for implementing the myriad programs established under the federal Clean Air Act, such as establishing and reviewing the federal ambient air quality standards and judging the adequacy of the SIPs. It has delegated the authority to implement many of the federal programs to the states while retaining an oversight role to ensure that the programs continue to be implemented.

CARB is responsible for establishing and reviewing the state ambient air quality standards, compiling the California SIP and securing its approval from the EPA, and identifying TACs. CARB also regulates mobile emissions sources in California, such as construction equipment, trucks, and automobiles, and oversees the activities of air quality management districts, which are organized at the county or regional level.

The county or regional air quality management districts are primarily responsible for regulating stationary emissions sources at industrial and commercial facilities within their geographic areas and for preparing the air quality plans that are required under the federal Clean Air Act and California Clean Air Act. The Bay Area Air Quality Management District (BAAQMD) is the regional agency with regulatory authority over stationary sources in the Bay Area. The BAAQMD has the primary responsibility to meet and maintain the state and federal ambient air quality standards in the Bay Area.

Air Quality Plans, Policies, and Regulations

Regional Plans and Policies

The San Francisco Bay Area Air Basin is currently designated nonattainment for the state ozone standards and the federal 8-hour ozone standard, though ozone levels measured at monitoring stations in Berkeley and Oakland have not exceeded either standard in recent years. Ozone and ozone precursors such as reactive organic gases (ROG) and nitrogen oxides (NO_x) are the pollutants of greatest concern in the Bay Area. The Bay Area also is designated as nonattainment for the state PM₁₀ standard and the state PM_{2.5} standard. The Bay Area is designated as either attainment or unclassified with respect to all other pollutants.

Two plans developed in part by the BAAQMD to meet federal and state air quality planning requirements for the San Francisco Bay Area Air Basin are:

- *San Francisco Bay Area 2001 Ozone Attainment Plan for the 1-Hour National Ozone Standard*¹ developed by the BAAQMD, the Metropolitan Transportation Commission, and the Association of Bay Area Governments (ABAG) to meet federal ozone air quality planning requirements; and
- *Bay Area 2000 Clean Air Plan*, the BAAQMD's most recent triennial update of the *1991 Clean Air Plan*, developed to meet planning requirements related to the state ozone standard.

The EPA revoked the national 1-hour ozone standard on June 15, 2005. In order to avoid losing clean air progress achieved under the 1-hour standard, EPA requires that certain emissions control requirements for areas designated as nonattainment (such as the Bay Area) or maintenance for the revoked 1-hour standard must remain in place (EPA, 2005). Currently, the BAAQMD, in cooperation with the Metropolitan Transportation Commission and ABAG, is preparing the Bay Area Ozone Strategy. The Ozone Strategy will address national and state air quality planning requirements. Moreover, it will include a redesignation request and a maintenance plan, as well as

¹ Note that the federal 1-hour National Ozone Standard was revoked by the U.S. EPA on June 15, 2005.

a triennial revision to the Bay Area strategy to attain the California state 1-hour ozone standard. The draft Ozone Strategy, including proposed control measures, is scheduled to be released in 2005 for public review.

BAAQMD Rules and Regulations

The BAAQMD exercises permit authority over stationary sources through its *Rules and Regulations*. Both federal and state ozone plans rely heavily upon stationary source control measures set forth in these *Rules and Regulations*. For the proposed project, the main BAAQMD rule that would apply would be District Regulation 11, Rule 2: Hazardous Materials–Asbestos Demolition, Renovation and Manufacturing, which regulates the demolition and removal of any potential asbestos-containing building materials.

California Vehicle Code Regulations

The California Vehicle Code (CVC), Section 23114 seeks to limit particulate emissions (blowing dust) from vehicles that transport aggregate materials by requiring that loads of aggregate materials be covered or that loads have a six-inch freeboard.

Local Plans and Policies

As a federal facility conducting work within the University of California’s mission, LBNL is generally exempt under the federal and state constitutions from compliance with local requirements. However, LBNL seeks to cooperate with local jurisdictions to reduce the physical consequences of its activities to the extent feasible. The project site is located within the city of Berkeley; however, there are no explicit air quality policies in the City of Berkeley General Plan that would relate to the proposed demolition activities.

Existing Air Quality

The BAAQMD operates a regional monitoring network that measures the ambient concentrations of the six criteria pollutants. The station closest to the project site is the Alice Street station in Oakland, approximately six miles south of the project site. This station monitors ozone and carbon monoxide. The nearest station that monitors size-specific particulate matter (PM₁₀ and PM_{2.5}) is located at Chapel Way in Fremont, approximately 30 miles southeast of the project site. The project site is considered typical of urban areas in the East Bay, so PM₁₀ and PM_{2.5} concentrations at the Fremont station provide some indication of likely concentrations at the project site.

Table IV.B-2 shows a five-year summary of monitoring data from the Oakland and Fremont stations for ozone, carbon monoxide, PM₁₀, and PM_{2.5} and compares these concentrations with state and federal ambient air quality standards. **Table IV.B-3** shows trends in regional exceedances of the federal and state ozone standards in the San Francisco Bay Area Air Basin.

TABLE IV.B-2
AIR QUALITY DATA SUMMARY (2000-2004) FROM SAN FRANCISCO BAY AREA MONITORING STATIONS NEAREST TO BERKELEY LAB^a

Pollutant	Standard ^b	Monitoring Data by Year				
		2000	2001	2002	2003	2004
Ozone:						
Highest 1-Hour Average (ppm) ^c		0.07	0.07	0.05	0.08	0.08
Days over State Standard	0.09	0	0	0	0	0
Days over Federal Standard ^d	0.12	0	0	0	0	0
Highest 8-Hour Average (ppm) ^c		0.05	0.04	0.04	0.05	0.06
Days over Federal Standard	0.08	0	0	0	0	0
Carbon Monoxide:						
Highest 8-Hour Average (ppm) ^c		3.4	4.0	3.3	2.8	1.9
Days over State/Federal Standard	9.0	0	0	0	0	0
PM₁₀:						
Highest 24-hour average (µg/m ³) ^c		<u>61.1</u>	<u>60.4</u>	<u>54.1</u>	37.2	27.8
Measured Days over State Standard ^e	50	2	3	1	0	0
PM_{2.5} :						
Highest 24-hour average (µg/m ³) ^c		44.8	56.8	48.0	33.5	20.3
Days over Federal Standard	65	0	0	0	0	0

- ^a Ozone and carbon monoxide concentration data are from the Alice Street monitoring station in Oakland. PM₁₀ and PM_{2.5} data are from the Chapel Way station in Fremont.
- ^b Generally, state standards are not to be exceeded and federal standards are not to be exceeded more than once per year. The annual PM_{2.5} standard is met if the 3-year average across officially designed clusters of sites falls below the standard.
- ^c ppm = parts per million; µg/m³ = micrograms per cubic meter.
- ^d The federal 1-hour standard was revoked by the EPA, June 15, 2005.
- ^e Measurements are collected every six days. Measured days include the days that a measurement was greater than the level of the standard. The actual number of days exceeding the standard is likely to be greater than presented here if each day had been monitored.

NOTE: **Bold underlined** values are in excess of applicable standards.

SOURCE: CARB, *Air Quality Data Statistics – Top Four Summary*, <http://www.arb.ca.gov/adam/cgi-bin/db2www/adamtop4b.d2w/start>, accessed January 28, 2005a.

Ozone

Ozone is a respiratory irritant and an oxidant that increases susceptibility to respiratory infections. At high enough concentrations, it also can cause substantial damage to vegetation and other materials. Ozone is not emitted directly into the atmosphere, but is instead a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving ROG, NO_x, and sunlight. ROG and NO_x are known as precursor compounds for ozone. Substantial ozone production generally requires ozone precursors in the presence of a stable atmosphere with strong sunlight for approximately three hours. Before the ozone can form, these precursor compounds can be transported substantial distances from the locations where they were emitted. Thus, ozone is not necessarily formed where the precursors are generated and is referred to as a regional pollutant. Ozone concentrations tend to be higher in the late spring, summer, and fall.

TABLE IV.B-3
SUMMARY OF OZONE DATA FOR THE SAN FRANCISCO BAY AREA AIR BASIN, 1990–2004

Year	Number of Days Standard Exceeded ^a			Ozone Concentrations in ppm ^b	
	State 1-Hour	Federal 1-Hour ^c	Federal 8-Hour	Maximum 1 Hour	Maximum 8 Hour
2004	7	0	0	0.11	0.08
2003	19	1	7	0.13	0.10
2002	16	2	7	0.16	1.11
2001	15	1	7	0.13	0.10
2000	12	3	9	0.15	0.14
1999	20	3	4	0.16	0.12
1998	29	8	16	0.15	0.11
1997	8	0	0	0.11	0.08
1996	34	8	14	0.14	0.11
1995	28	11	18	0.16	0.12
1994	13	2	4	0.13	0.10
1993	19	3	5	0.13	0.11
1992	23	2	6	0.13	0.10
1991	23	2	6	0.14	0.11
1990	14	2	7	0.13	0.11

^a This table summarizes data from the over 30 monitoring stations in the Bay Area that did or do monitor ozone.

^b ppm = parts per million.

^c The federal 1-hour standard was revoked by the EPA on June 15, 2005.

SOURCE: CARB, *The 2005 California Almanac of Emissions and Air Quality*, <http://www.arb.ca.gov/aqd/almanac/almanac05/almanac05.htm>, accessed January 31, 2005f.

Table IV.B-2 indicates that there have been no exceedances of the state and the federal 1-hour ozone standards in the last five years at the monitoring sites nearest Berkeley Lab. Moreover, primarily as a result of stricter motor vehicle controls and turn-over in the vehicle fleet, emissions of ozone precursors in the area are expected to decrease with time. Specifically, in Alameda County, total ROG and NO_x emissions are expected to decrease by approximately 25 and 50 percent respectively between 2005 and 2020 (CARB, 2005f). The importance of motor vehicles in affecting ambient ozone concentrations is apparent in the proportion of ambient ROG and NO_x emitted by on-road vehicles: in 2004, on-road motor vehicles were responsible for approximately 40 percent of the ROG and 60 percent of the NO_x emitted in Alameda County (CARB, 2005d).

Carbon Monoxide

Carbon monoxide is a product of incomplete combustion and is mostly associated with motor vehicle traffic. The highest carbon monoxide concentrations generally occur during winter months when periods of light winds combine with the formation of ground level temperature

inversions (typically from the evening through early morning), which limits pollutant dispersion. The cooler temperatures in winter also induce formation of carbon monoxide from vehicle engines.

When inhaled, carbon monoxide combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced oxygen reaching the brain, heart, and other body tissues, a condition that is especially critical for people with cardiovascular diseases, chronic lung disease, or anemia.

Table IV.B-2 shows that there have been no exceedances of state and federal ambient carbon monoxide standards at the Alice Street station in Oakland in the last five years. Moreover, as with emission of ozone precursors, in Alameda County, carbon monoxide emissions are expected to decrease by approximately 45 percent between 2005 and 2020 (CARB, 2005f). This decrease will occur largely as a result of tighter controls of emissions from on-road motor vehicles, which in 2004 were responsible for approximately 70 percent of the carbon monoxide emissions in Alameda County (CARB, 2005d).

Particulate Matter

PM₁₀ and PM_{2.5} refer to particulate matter that is 10 microns or less in diameter and 2.5 microns or less in diameter, respectively.² Particulate matter of these sizes can be inhaled deep into the lungs and can cause adverse health effects. Particulate matter in the atmosphere results from many kinds of dust- and fume-producing industrial and agricultural operations, fuel combustion, and atmospheric photochemical reactions, as well as demolition and construction activities. Particulate concentrations are generally higher during the winter, when meteorological conditions limit the dispersion of contaminants. Very small particles of certain substances (e.g., sulfates and nitrates) can cause lung damage directly, or can contain adsorbed gases (e.g., chlorides or ammonium) that may be injurious to health. Particulates also can damage materials and reduce visibility.

Data from the monitoring station in Fremont indicate that there were two days over the state 24-hour PM₁₀ standard in 2000, three in 2001, one in 2002, and none since (see **Table IV.B-2**). In general, emissions of particulate matter are not expected to change drastically with time. In Alameda County, direct PM₁₀ emissions are expected to increase by approximately 5 percent between 2005 and 2020, while direct PM_{2.5} emissions are expected to remain unchanged between 2005 and 2020 (CARB, 2005f).

Other Criteria Pollutants

The standards for the other criteria pollutants (i.e., nitrogen dioxide [NO₂], sulfur dioxide [SO₂], and lead) are being met in the Bay Area, and the latest pollutant trends suggest that these standards will not be exceeded in the foreseeable future (CARB, 2005f).

² A micron is one-millionth of a meter, or less than one-25,000th of an inch. For comparison, human hair is 50 or more microns in diameter.

Sensitive Receptors

Some land uses are known as “sensitive receptor areas” because people there are considered more sensitive to air pollutants than others for reasons that include pre-existing health problems, proximity to emissions source, or duration of exposure to air pollutants. Schools, hospitals, and convalescent homes are considered relatively sensitive to air quality because children, elderly people, and the infirm are more susceptible to respiratory distress and other air quality-related health problems than the general public. Residential areas are also considered sensitive to air quality because people such as children, elderly people, and the infirm (i.e., those most susceptible to air-quality related health problems) usually stay home for extended periods of time, with associated greater exposure to ambient air quality in residential areas. Recreational uses are also considered sensitive receptors because vigorous exercise associated with recreation places a high demand on the human respiratory system.

Sensitive receptor areas in the vicinity of the project site include residential areas and nearby dormitories associated with the University. The nearest sensitive receptors are the single- and multi-family residences to the southwest and single-family residences to the north of the project site. These areas are generally not downwind of the site, given that the predominant daytime winds are from the west and northwest, and those predominant winds would carry airborne emissions from the project site away from those sensitive receptors.

Impacts and Mitigation Measures

Significance Criteria

The impact of an LBNL project on air quality would be considered significant if it would exceed the following standards of significance, in accordance with Appendix G of the state CEQA Guidelines and the UC CEQA Handbook:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations;
- Create objectionable odors affecting a substantial number of people; or
- Exceed an applicable LRDP or Program EIR standard of significance.

As described in the *BAAQMD CEQA Guidelines* (BAAQMD, 1999), the BAAQMD’s approach to the analyses and evaluation of construction impacts, including demolition activities, is to emphasize implementation of effective and comprehensive control measures rather than detailed

quantification of emissions.³ The BAAQMD considers any project's construction-related impacts to be less than significant if the required dust-control measures are implemented. The *BAAQMD CEQA Guidelines* have established thresholds of significance for emissions of criteria air pollutants associated with operation of projects; emissions in excess of these standards constitute a significant impact. In cases where project-level impacts would be less than significant, the cumulative effect is evaluated based on a determination of the consistency of the project with the local general plan (the 1987 LBNL LRDP in this case) *and* the consistency of the LRDP with the regional Clean Air Plan (CAP). To be consistent with the CAP, the LRDP must be based on population projections that are consistent with those used in developing the CAP and must provide for a rate of increase in vehicle miles traveled that does not exceed the rate of increase in population.

Measures Included as Part of the Project

As more fully described in the 1987 LRDP EIR, as amended, potential air quality impacts could result from continued University operation of LBNL, including continued facility development as contemplated in the 1987 LRDP. The following relevant impacts to air quality were anticipated and analyzed pursuant to CEQA, as part of the programmatic 1987 LRDP EIR, as amended:

Impact III-J-1:	Construction of new facilities projected in the 1987 LRDP would generate short-term emissions of air pollutants.
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As a result of anticipated impacts on air quality, the following mitigation measure, adopted as part of the 1987 LRDP EIR, as amended, is already required for the proposed project and therefore is incorporated as part of the proposed project:

Mitigation Measure III-J-1:	Construction contract specifications would require that during construction exposed surfaces would be wetted twice daily or as needed to reduce dust emissions. In addition, contract specifications would require covering of excavated materials.
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In addition, LBNL's Facilities Master Specifications (General Environment, Safety, and Health Requirements) require subcontractors to comply with an array of federal and state requirements, specifically including BAAQMD regulations and the *BAAQMD CEQA Guidelines*. The latter guidelines state that if the "Feasible Control Measures for Construction Emissions of PM₁₀" (Table 2) will be implemented, then air pollutant emissions from construction activities would be considered a less-than-significant impact. Accordingly, as part of the project, construction specifications would include the Basic Control Measures set out in these guidelines. These are:

- Water all active construction areas at least twice daily;

³ BAAQMD significance thresholds for project operation are not included in this discussion because the project does not include the construction or operation of any future structures on the project site. Thus, this project is unlike most other projects, for which long-term, ongoing future use and related air quality impacts must be presumed.

- Cover all trucks hauling soil, sand, and other loose materials *or* require all trucks to maintain at least two feet of freeboard;
- Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites;
- Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas at construction sites; and
- Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.

Impacts

Impact IV.B-1: Project-related demolition activities would generate short-term emissions of criteria pollutants, including fine and respirable particulate matter and equipment exhaust emissions, and possibly asbestos-containing materials. (Less than Significant)

Demolition activities could create a temporary adverse effect on the local air quality of the site and its surroundings. These activities have the potential to generate 1) dust (including PM₁₀ and PM_{2.5}), primarily from “fugitive” sources (i.e., emissions released through means other than through a stack or tailpipe); and 2) lesser quantities of other criteria air pollutants, primarily from tailpipe emissions from haul trucks and heavy equipment construction and demolition machinery (primarily diesel-powered) and worker automobile trips (primarily gasoline-powered). The project may also involve demolition and removal of asbestos-containing building materials.

As described in Chapter III, Project Description, the Bevatron apparatus would be disassembled and Building 51 and the foundation slabs and tunnels underneath the building would be demolished. All work related to disassembly and removal of the internal structures (i.e., the concrete shielding blocks and the Bevatron machine) would occur while the exterior building structure is in place, minimizing the release of dust and other emissions. Subsequently, this external building would be demolished. After demolition of the building, the slab and foundation structure would be demolished. Later demolition steps would include excavation of approximately 200 cubic yards of contaminated soils and backfill of the site with an estimated 20,000 cubic yards of clean fill.

Fugitive Dust

The two major fugitive dust sources would be 1) the concrete breaking using the hoe-ram and loading of the broken concrete into trucks, and 2) the general demolition⁴ of the building and loading of structural debris. Because much of the concrete breaking and demolition of internal structures would occur while the external Building 51 structure is in place, fugitive dust emissions would tend to be largely contained within the volume of the structure, where they could be more easily controlled. For the remaining fugitive dust that would not be contained within the

⁴ Removal and disposal of the asbestos-containing siding would be completed before the general demolition of the building would begin. Effective dust control measures would be a part of the asbestos abatement procedure.

building, the majority of the particles would settle out of the atmosphere well within the boundaries of LBNL, due to the substantial distances from the project site to the LBNL boundaries.

As noted earlier, the BAAQMD's approach to analyses and evaluation of construction impacts, including demolition activities, is to emphasize implementation of effective and comprehensive control measures as detailed in the BAAQMD CEQA Guidelines, rather than detailed quantification of emissions. These control measures are a part of the project. Measures that would be applied to control fugitive dust include the general BAAQMD measures, as well as measures required by the U.S. Department of Labor Occupational Safety and Health Administration (OSHA). As discussed in more detail in Section IV.F., Hazards and Hazardous Materials, concrete dust created by breaking or cutting of concrete shielding blocks and of slabs and foundation must be controlled by OSHA-required measures that limit worker exposure to crystalline silica dust. These control measures, to be implemented at the point at which the fugitive dust would be generated, require the use of water sprays or engineering controls. Such measures would be required during the demolition of the slab and foundation structure.

As noted earlier, the BAAQMD considers a project's construction-related fugitive dust (including PM₁₀ and PM_{2.5}) impacts to be less than significant if all of the required dust control measures are implemented. Because the various dust control measures included in the project description and the standard LBNL procedures noted above incorporate all of the BAAQMD's basic required measures, construction dust impacts to both on-site and off-site receptors would be less than significant.

Tailpipe Emissions

In addition to fugitive dust emissions, the operation of diesel- and gasoline-powered demolition equipment and demolition-related haul trucks, along with worker commute trips, would also generate ozone precursors, carbon monoxide, and DPM emissions. The diesel-powered demolition equipment that would be working on-site at various times during the span of the project could include heavy equipment such as boom cranes, fork-lift, front-end loader, back-hoe, ram impact hammer, grader, and compaction roller. The flat-bed and dirt haul trucks required to transport materials to and from the site would also be diesel-powered. Overall, an estimated maximum of about 4,700 one-way truck trips would be required over the lifetime of the project. Maximum frequency is expected to be no more than 34 daily one-way truck trips for hauling material into and out of the site. In addition, worker trips are estimated at up to 124 daily individual trips during peak demolition activity periods. (See Section IV.K, Transportation/Traffic.)

Criteria Air Pollutant Emissions

Not all demolition equipment would be on-site or operating at the same time, thereby reducing the potential short-term impact of these tailpipe emission sources. Moreover, diesel- and gasoline-powered equipment operation would be limited to work hours, and LBNL contract provisions would place limits on equipment idling, require use of electric power in lieu of internal

combustion engine power, require use of low-sulfur diesel fuel, and require equipment maintenance to reduce gaseous emissions. As a result of these measures, emissions of criteria air pollutants would be reduced.

Likewise, haul truck and worker commute trips would occur over a limited period of time, as described in Section IV.K, Transportation/Traffic, and would represent less-than-significant increases in auto and truck traffic on those streets and roads. Therefore, the resulting impact on local air quality from criteria pollutant emissions would be less than significant.

Diesel Particulate Matter Emissions

In addition to criteria pollutants, the diesel-powered trucks and demolition equipment would also generate DPM. As noted previously, CARB identified DPM as a TAC in 1998. In addition, CARB implemented a diesel risk reduction plan.

The project activities involving diesel-operated equipment releasing DPM emissions would be temporary, occurring periodically over a more than four-year period, but the scheduled regulatory reductions of DPM emissions that begin in 2007 to lower the resultant health risk from DPM by 75 percent in 2010 may further lower emissions from these sources if newer equipment is used. Although the exact amount of the DPM emissions reduction is not known, substantially greater reductions in DPM emissions are expected to occur for large on-road trucks than for off-road equipment.

Even accounting for the source reductions, the exposure of the public to DPM emissions from haul trucks would be greater than the exposure to DPM emissions from on-site demolition equipment, primarily because the haul trucks would pass within approximately 30 feet of some residences in Berkeley, while the Building 51 work site, where the demolition equipment would operate, is 1,100 feet or more from the nearest residences. This very large difference in distances is sufficient to determine that the concentrations of project DPM in exhaust emissions that would reach any residence would be much less for on-site equipment than for haul trucks. It is possible to make a conservative estimate of the health risk from DPM emissions from project-related truck hauling for a resident along a truck route by considering that the exposure, and the related health risk, would be a function of the number of trucks, on a yearly basis, that would pass by a residence. The overall incremental risk from these truck emissions would also be a function of the specific years in which the activities would occur. The total number of one-way truck trips that would occur over the multi-year duration of demolition activities is estimated to be approximately 4,700.

DPM emissions from the truck trips were estimated using the California Air Resources Board model, EMFAC2002. This model relies on emission factors for heavy-duty diesel trucks, similar to those to be used for the project; these factors are derived from emission measurements of equivalent-sized trucks. The estimated DPM emissions for 2,000 annual truck trips⁵ were then input into the EPA dispersion model SCREEN3 to calculate ambient air concentrations of DPM

⁵ The 2,000 one-way truck trips per year for each of 3 years is an overestimate of the project truck traffic, so it overestimates total DPM emissions and total risk.

(exposure levels) at receptors near the haul truck route roadways. Distances as close as 30 feet from the roadway were assumed in the modeling. The model predicted the worst-case annual average concentration of DPM to be $0.0008 \mu\text{g}/\text{m}^3$. Assuming that these project truck emissions would occur beginning in 2006, the total exposure of DPM at the maximum receptor would result in an incremental cancer risk of approximately 0.01 in a million.⁶ This would be 1/1000th of the health risk significance criterion value of 10 in a million.

For the reasons stated above, the concentrations of project DPM that would reach any residence from on-site equipment would be much less than the concentrations of project DPM at residences near haul truck routes. Even with longer durations of exposure, the total of the exposures to DPM from on-site project equipment, and the associated health risk, at any residence would also be smaller than the DPM exposure and risk at residences near haul truck routes.

Because the DPM health risk from the on-site sources would be much less than the DPM health risk from haul trucks, the overall health risk from DPM from both sources would therefore be approximately 0.01 in a million.

This estimate of the project's incremental cancer risk can be considered to be conservative for several reasons. First, the model SCREEN3 that was used in the analysis uses hypothetical worst-case meteorology to calculate ambient air concentrations. This includes very stable atmospheric conditions and low wind speeds over an entire year. In addition, the DPM emissions that were input into the model were estimated for the first year of expected activities (2006). By 2010, as shown by EMFAC2002, DPM emissions are expected to be reduced by about 30 percent because stricter state and federal emission regulations would come into effect. Lastly, the risk estimate assumes that residents are present during all exposure periods.

Thus, the health risk from the exposure to DPM from both on-site diesel-powered equipment and project haul trucks would be approximately 1/1000th of the health risk significance criterion value of 10 in a million; the impact of the public exposure to DPM would be less than significant.

Asbestos

The exterior siding of Building 51 was constructed with transite, a material typically containing approximately 20 percent non-friable chrysotile asbestos fibers. Given the age of Building 51, it is likely that other parts of the building were also constructed using asbestos-containing materials. Since airborne asbestos poses a serious health threat, the demolition and removal of any potential asbestos-containing building materials would be handled according to LBNL's Asbestos Management Program (discussed further in Section IV.F, Hazards and Hazardous Materials), which is tailored to meet the requirements of BAAQMD Regulation 11, Rule 2: Hazardous Materials—Asbestos Demolition, Renovation and Manufacturing. This program includes standards of operation necessary to control asbestos emissions, and identifies any prior notification and permitting requirements. With adherence to this program, the exposure of the public and of the workers to airborne asbestos would be controlled and the impacts associated with exposure to

⁶ Calculated using the carcinogenic risk factors published by the California Office of Environmental Health Hazard Assessment. The risk factors for DPM are based on a total dosage or exposure over a human lifetime of 70 years.

airborne asbestos would be less than significant.⁷ An asbestos demolition notification to the BAAQMD would be required; if regulated asbestos is present, an asbestos renovation notification would also be needed.

Odor

There are no identified activities of the proposed project that would have the potential to create nuisance or objectionable odors that would affect people off-site.

Mitigation: None additional required.

Cumulative Impacts

Impact IV.B-2: The proposed project could potentially result in a cumulatively considerable contribution to regional air quality impacts. (Less than Significant)

The project would generate air emissions only from temporary demolition-related activity and traffic.

Given that the project-level air quality impacts would be less than significant, the cumulative effect also can be based on a determination of the consistency of this project with the LRDP and the consistency of the LRDP with the regional CAP.

Because the proposed project is consistent with the LRDP and, in turn, because the LRDP has been determined to be consistent with the CAP, the contribution of these emissions to cumulative regional air quality would not be considered to be cumulatively considerable. The cumulative impact would be less than significant.

Please refer to the cumulative impacts discussion in Section IV.A, Aesthetics, for a discussion of the reasons why the cumulative effects of a potential future project of unknown purpose and size at the Building 51 site are expected to be less than significant. Regarding air quality impacts in particular, the current 1987 LRDP is consistent with the CAP, and the new LRDP currently under preparation is expected to be consistent with the CAP. In combination with the other factors listed earlier, a future project at the Building 51 site would not be expected to contribute considerably to a cumulatively significant air quality impact.

Mitigation: None additional required.

⁷ Section IV.F, Hazards and Hazardous Materials, addresses impacts associated with demolition of radioactively-contaminated building material as well as building surfaces painted with lead-based paint.

Summary of Impacts and Mitigation Measures

The proposed project would not exceed applicable standards of significance and would result in no significant air quality impacts. The project would incorporate Mitigation Measure III-J-1 from the 1987 LRDP EIR, as amended.

Building 51 Demolition Project-Specific Mitigation Measures: None.

References –Air Quality

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- U.S. Environmental Protection Agency (EPA), *Six Common Air Pollutants*, <http://www.epa.gov/air/urbanair/6poll.html>, updated July 19, 2005.

C. Biological Resources

Introduction

This section discusses existing biological resources at the Building 51 project site and analyzes the potential for the project to affect those resources. Information for the discussion and subsequent analysis was drawn from field surveys of the project site, surveys of other project sites at LBNL, and surveys of the entire LBNL hillside site (ESA, 2005; ESA, 2002a, 2002b, and 2002c; and ESA, 2003a, 2003b); biological data presented in the California Department of Fish and Game Natural Diversity Data Base (CNDDB)¹ and the California Native Plant Society's (CNPS) *Electronic Inventory of Rare and Endangered Vascular Plants of California*; standard biological references (Sawyer and Keeler-Wolf, 1995; Hickman, 1993; Zeiner et al., 1990; and Stebbins, 1985); local historical and current information on the project area's biological resources from a variety of sources; LBNL's 1987 LRDP EIR, as amended; and environmental documents prepared for the 1987 LRDP EIR, as amended, and for previous LBNL projects. Potential effects of the proposed project on sensitive species and habitats are identified and mitigation measures are proposed to reduce any significant impacts to less-than-significant levels.

Setting

The project site is located on the western slopes of the Oakland-Berkeley Hills, where low- to moderate-density residential neighborhoods are mixed with open space containing a mosaic of vegetation types and wildlife habitats, including oak and mixed evergreen forests, native and non-native grasslands, chaparral, coastal scrub, marsh and wetland communities, and riparian scrubs and forests. LBNL consists of a mix of built and undeveloped spaces, where activities range from industrial-scale operations and construction to minimally invasive vegetation management. These uses often occur adjacent to one another. LBNL is located within one mile of several large tracts of relatively undeveloped open space and preserved land, including Tilden Regional Park and Claremont Canyon Regional Preserve. These lands are contiguous to the south and east with undeveloped watershed lands owned by the East Bay Municipal Utility District (EBMUD) and with Sibley Regional Volcanic Preserve and Redwood Regional Park.

Normal operations around the Lab site include ongoing and intermittent activities that may happen throughout the business day and, to a lesser extent, during evening and off-hours. Such activities include, but are not limited to, shuttle bus, diesel truck, and heavy equipment operation; vegetation management activities involving chipping, weed cutting, chain sawing, and goat grazing for weed control; and outdoor operations such as roofing, building maintenance, carpentry, road excavation and repair, minor excavating, minor demolition, and minor construction activities associated with facilities maintenance. These activities are covered for CEQA purposes under the 1987 LRDP EIR, as amended, and under specific CEQA reviews as appropriate.

¹ The CNDDB is a computer data base that describes the location and distribution of animals and plants that are rare, threatened, endangered or candidate species, or habitat considered to be of high quality or of limited distribution.

The Building 51 project site is located in the northern portion of LBNL. This area of the Lab is approximately two-thirds developed and one-third open space. The Building 51 site is thus surrounded by other existing buildings and fragmented areas of open space. The site is part of a substantial plateau that was graded (cut and filled) for development into a northeast to southwest sloping hillside. The Building 51 site itself is almost entirely developed, with the exception of two small areas of ornamental landscaping adjacent to the front entrance. The slopes adjacent to the building and to the east lead up to McMillan Road; those to the south lead up to Lawrence Road. These slopes are covered with an understory of non-native grassland and an overstory consisting of a mix of coast live oak, conifers, and eucalyptus. Across Lawrence Road to the southwest is a slightly larger area of oak woodland and Blackberry Canyon, with a mixture of oak-bay woodland and bay woodland vegetation types located approximately 500 feet to the north of the site. Understory vegetation (non-native annual grasses and other herbaceous species) on the slopes adjacent to the site is managed on an annual basis.

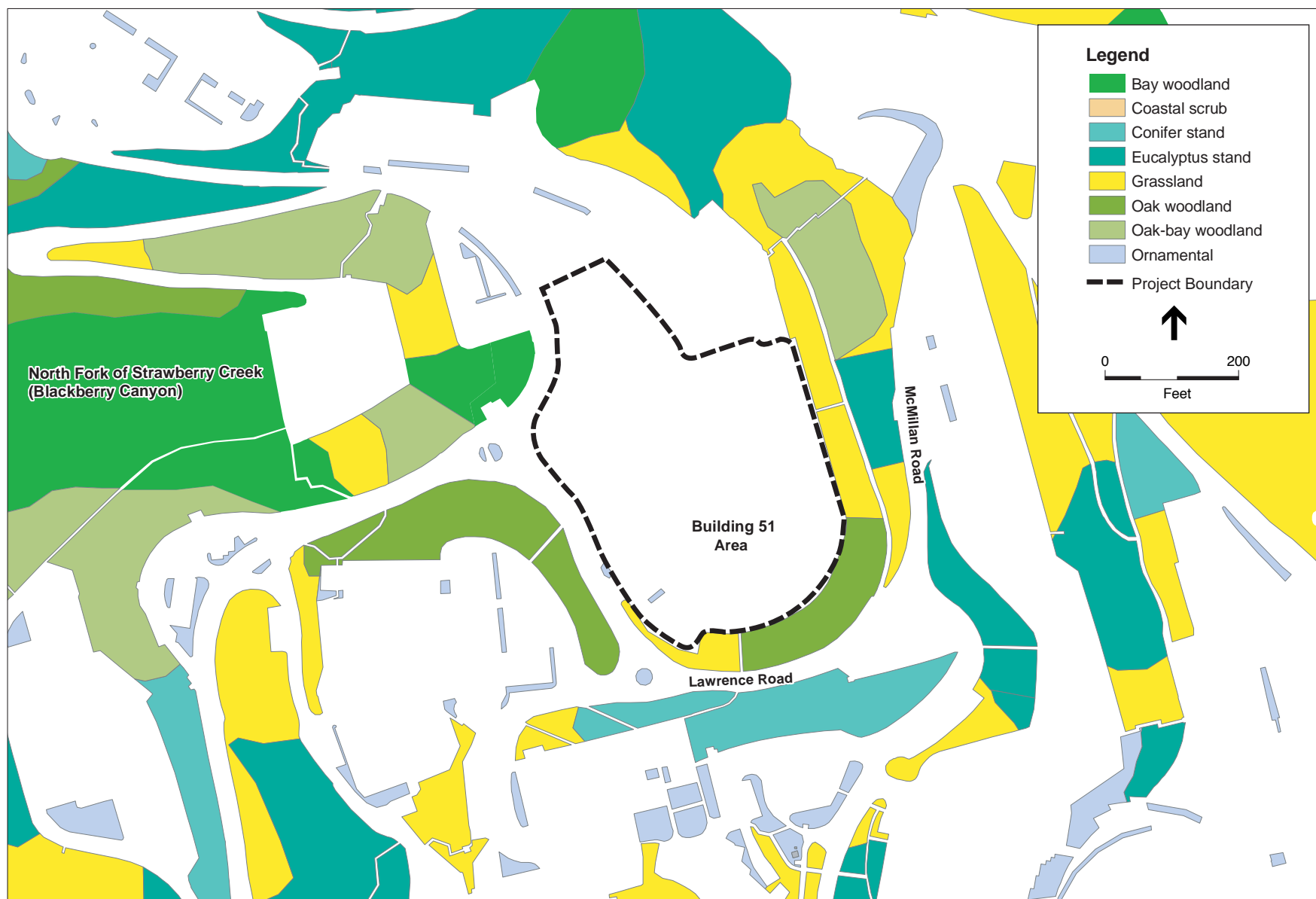
Plant Communities and Wildlife Habitat

Vegetation communities are assemblages of plant species that occur together in the same area and are defined by species composition and relative abundance. The vegetation/habitat classification system for this project is based on Sawyer and Keeler-Wolf (1995) and influenced by the classification system of Holland (1986). Vegetation series generally correlate with wildlife habitat types. Wildlife habitats were classified and evaluated using the California Department of Fish and Game (CDFG) *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer, 1988). The CNDDDB (CDFG, 2005) lists several sensitive natural communities as occurring in the regional vicinity of the project area, including northern maritime chaparral, serpentine bunchgrass, and valley needlegrass grassland. None of these communities occurs on or in the immediate vicinity of the project site, however.

As noted above, the Building 51 project site itself is, for the most part, fully developed and devoid of vegetation. However, adjacent vegetated areas provide potential habitat for common and special-status wildlife species. Vegetation types in the vicinity of the project site include annual grassland, coast live oak woodland, California bay woodland, oak-bay woodland, conifer stand, eucalyptus stand, and landscaped areas. Common wildlife observed at the proposed project site, as well as in other similarly developed sites during field surveys throughout the LBNL hillside area (ESA, 2005; ESA, 2002a, 2002b, and 2002c; and ESA, 2003a, 2003b) includes species tolerant of human presence such as California mule deer (*Odocoileus hemionus californicus*), fox squirrel (*Sciurus niger*), California towhee (*Pipilo crissalis*), chestnut-backed chickadee (*Poecile rufescens*), and western scrub jay (*Aphelocoma coerulescens*). Please see **Figure IV.C-1** for locations of vegetation types and their relation to Building 51. Please see Appendix B for detailed descriptions of each vegetation type and the common and special status animals for which they may provide habitat.

Special-Status Species

For the purposes of this EIR, the term “special-status species” includes species that are listed and receive specific protection defined in federal or state endangered species legislation. The term



SOURCES: LBNL (2003) and ESA (2003)

Demolition of Building 51 and the Bevatron / 204442 ■

Figure IV.C-1
Vegetation Types in the Building 51 Vicinity

also includes other species that have not been formally listed as threatened or endangered but have been designated as species “of concern,” or as “rare” or “sensitive” on the basis of adopted policies and expertise of federal or state resource agencies or organizations with acknowledged expertise, including the U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Game (CDFG), National Marine Fisheries Service (now known as “NOAA Fisheries”²), and the California Native Plant Society. Specifically, the following categories are included: federally listed endangered and threatened species; species proposed for listing as endangered or threatened; candidates for such listing; federally identified species of concern and species of local concern; state-listed endangered and threatened species, and rare (plants only) species; California Species of Special Concern; species designated “special animals” by the state; “fully protected” species (of which there are about 35, most of which are also listed as either endangered or threatened); and raptors (birds of prey), which are specifically protected by Fish & Game Code Section 3503.5, which prohibits the take, possession, or killing of raptors and owls, their nests, and their eggs.³ These species are referred to collectively as “special-status species” following a convention that has developed in practice but has no official sanction. Special-status species in the project area are protected under the federal and California Endangered Species Acts, the California Native Plant Protection Act, or the California Fish and Game Code, which are discussed in the “Regulatory Environment” section below. The project area does not contain any applicable special-status species designated by local agencies.

A list of special-status plant and animal species reported to occur in the vicinity of the project site was compiled on the basis of data in the California Natural Diversity Data Base (CDFG, 2005), the California Native Plant Society *Electronic Inventory* (CNPS, 2005), special-status species information from the U.S. Fish and Wildlife Service (USFWS, 2005), and biological literature of the region. The special-status species list presented in Table XI.B-1 (see Appendix B in Chapter XI) is intended to be comprehensive and includes species for which potential habitat (i.e., general habitat types) occurs within or in the vicinity of the project site. With the exception of Cooper’s hawk, a California species of concern, and red-tailed hawk, and American kestrel, both protected under Section 3503.5, no special-status plants or wildlife have been identified on the Building 51 project site or elsewhere at LBNL during field surveys (ESA, 2005; ESA, 2002a, 2002b, and 2002c; and ESA, 2003a, 2003b), although other special-status species are judged to have at least a moderate potential to occur, based on habitat conditions, as discussed below.

Special-Status Animals

Of the special-status plants and animals presented in Table XI.B-1 (see Appendix B), nine special-status bird and bat species have either been observed at LBNL or were determined to have

² The National Oceanic and Atmospheric Administration Fisheries Service, or NOAA Fisheries, formerly the National Marine Fisheries Service or NMFS, has responsibility for fisheries resources, but has no jurisdiction over upland areas where there is no stream access for anadromous fish, such as LBNL.

³ The inclusion of birds protected by Fish & Game Code Section 3503.5 is in recognition of the fact that these birds are substantially less common in California than most other birds, having lost much of their habitat to development, and the recognition that the populations of these species are therefore substantially more vulnerable to further loss of habitat and to interference with nesting and breeding than are most other birds. It is noted that a number of raptors and owls are already specifically listed as threatened or endangered by state and federal wildlife authorities.

at least a moderate potential to occur within the Building 51 project vicinity and are thus fully considered in the impact analysis. **Table IV.C-1** lists these species.⁴

Cooper's hawk, sharp-shinned hawk, red-tailed hawk, American kestrel, great horned owl, and olive-sided flycatcher may all potentially make use of the oak, conifer, or eucalyptus trees in the vicinity of the Building 51 project site for nesting purposes. Bewick's wren may potentially use coast live oaks or landscaped areas adjacent to Building 51 for nesting. Long-eared and fringed myotis may potentially establish maternal roosts in trees with cavities, such as oaks, conifers, and eucalyptus that occur in the project vicinity.

Under Section 9 of the federal Endangered Species Act, a "take" is defined as an act to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect or to attempt to engage in any such conduct."⁵ Therefore, for special-status birds, this EIR considers direct removal of nesting substrate or the destruction of nests and eggs, as well as indirect impacts such as noise generated by construction, which can result in disturbance of breeding birds, nest abandonment, and mortality of young, as "take" under the regulations protecting special-status species (see "Regulatory Environment" section below). For special-status bats, destruction of maternal roosts or indirect impacts resulting in maternal roost abandonment are considered "take."

Special-Status Plants

A thorough review and analysis of special-status plant species listed by the USFWS (2005), CDFG (2005), and CNPS (2005) databases as occurring in the project vicinity indicates that the likelihood of adverse project impacts for most of the species listed is extremely low for the following reasons:

- Suitable habitat for the species either never existed on the project site or no longer exists due to historical and ongoing disturbance of soils and vegetation.
- The species is not documented within the general vicinity of the project site (i.e., the western side of the Oakland-Berkeley Hills).
- Only historical occurrences for the species are documented from the area;
- The species has been extirpated from the quadrangle or county.

Generally, the potential for special-status plant species to occur at LBNL is low; none have been observed in past environmental studies prepared for LBNL (LBNL, 1992; LBNL, 1994; LBNL, 1997; and SAIC, 1994), and none were observed during recent general biological resource surveys (ESA 2002a, 2002b, 2002c and ESA, 2003a, 2002b). The LBNL hill site as a whole has been subject to ongoing disturbance, first in the form of grazing and then in the form of development, for the past 200 years. These types of disturbances, combined with the introduction of highly competitive non-native plant species, have resulted in the extirpation of a number of

⁴ Alameda whipsnake (*Masticophis lateralis euryxanthus*), threatened under both federal and state law, have not been sighted at LBNL, but suitable habitat may be present on the Lab site. However, this would most likely be at the eastern corner of the Lab property, contiguous with open space to the north and east. Suitable habitat is not present at or near Building 51.

⁵ Definitions under the California Endangered Species Act are similar, although "harass" is not included.

**TABLE IV.C-1
SPECIAL-STATUS SPECIES POTENTIALLY PRESENT IN PROJECT AREA**

Common Name Scientific Name	Listing Status USFWS/CDFG	General Habitat	Potential for Species Occurrence within the Project Area	Period of Identification
Birds				
Cooper's hawk <i>Accipiter cooperi</i>	--/CSC	Nests in riparian growths of deciduous trees and live oak woodlands	Moderate potential. Nesting habitat is available adjacent to project site. Observed with kill upslope from Blackberry Canyon gate (ESA, 2003a).	March–July
Sharp-shinned hawk <i>Accipiter striatus</i>	--/CSC	Nests in riparian growths of deciduous trees and live oaks	Moderate potential. Potential nesting habitat is present on the north fork of Strawberry creek, low potential to forage in and around project site.	March–July
Olive-sided flycatcher <i>Contopus cooperi</i>	FSC/--	Inhabits open conifer or mixed woodlands; nests in large coniferous trees	Moderate potential. Suitable perching, foraging and nesting habitat is present adjacent to project site, but species is relatively rare in East Bay Hills.	May–August
Bewick's wren <i>Thryomanes bewickii</i>	FSC/--	Inhabits chaparral, scrub, and landscaped areas; may also be found in riparian and edges of woodland habitats	Moderate potential. Preferred habitat is present throughout LBNL. Species has potential to nest in landscape shrubs and oaks on and adjacent to project site.	Year-round
Great horned owl <i>Bubo virginianus</i>	--/3503.5	Often uses abandoned nests of corvids or squirrels; nests in large oaks, conifers, eucalyptus	Moderate potential. Suitable nesting habitat occurs in eucalyptus and conifer stands adjacent to project site.	Year-round
Red-tailed hawk <i>Buteo jamaicensis</i>	--/3503.5	Usually nests in large trees, often in woodland or riparian deciduous habitats	Moderate potential. Suitable nesting habitat is present in stands of large trees adjacent to site. Observed foraging at LBNL (ESA, 2002a).	Year-round
American kestrel <i>Falco sparverius</i>	--/3503.5	Frequents generally open grasslands, pastures, and fields; primarily a cavity nester	Moderate potential. Observed foraging at LBNL (ESA, 2003b). Potential nesting habitat available in cavities in mature oaks or pines adjacent to project site.	Year-round
Mammals				
Long-eared myotis <i>Myotis evotis</i>	FSC/--	Inhabits woodlands and forests up to approximately 8,200 feet in elevation; roosts in crevices and snags	Moderate potential. Suitable foraging and roosting habitat is present in project area.	March–August
Fringed myotis <i>Myotis thysanodes</i>	FSC/--	Inhabits a variety of woodland habitats, roosts in crevices or caves, and forages over water and open habitats	Moderate potential. Suitable foraging and roosting habitat is present in project area.	March–August

STATUS CODES:

FEDERAL: (U.S. Fish and Wildlife Service [USFWS])

STATE: (California Department of Fish and Game [CDFG])

FSC = Federal species of concern; may be endangered or threatened, but not enough biological information has been gathered to support listing at this time

CSC = California Species of Special Concern
3503.5 = California Fish and Game Code Section 3503.5, Protection for nesting species of Falconiformes (hawks) and Strigiformes (owls)

plant species that were documented in the Berkeley area in the late 1800s and early 1900s. In addition, the suppression of fire in the urbanized hills has resulted in mature stands of scrub and woodland with dense canopy cover and little understory. Since many herbaceous species tend to grow only in canopy openings in these habitat types, such species are unlikely to occur on the hill site, as they can neither compete with the dense shrubs for soil moisture and nutrients nor obtain enough sunlight through the dense canopy. LBNL aggressively manages vegetation on virtually the entire hill site for fire protection. Through the reintroduction of grazing, as well as fuel reduction by mechanical means, LBNL has converted both coastal scrub habitat and stands of eucalyptus and French broom to grassland in recent years. Although small areas of patchily distributed native grasses remain scattered throughout LBNL, the native herbaceous species observed in these areas are those that are commonly found throughout the Oakland-Berkeley Hills (ESA 2002a, 2002b, 2002c and ESA, 2003a, 2002b). Generally, less common species in the hills tend to be found on serpentine or other ultramafic soils or on thin soils, such as occur in roadcuts, where non-native species do not compete as readily. These types of soils were not observed at LBNL during ESA's field surveys. The Building 51 site itself is fully developed, precluding the establishment of plant cover; the grassy and wooded slopes directly adjacent upslope are not expected to support special-status plants for the reasons outlined above.

Sensitive Natural Communities

The CNDDDB (CDFG, 2005) lists several sensitive natural communities as occurring in the U.S. Geological Survey quadrangles searched, including northern maritime chaparral, serpentine bunchgrass, and valley needlegrass grassland. However, none of these communities, as described by Holland (1986), occurs on or in the vicinity of the project site.

Potential Jurisdictional Waters

The CDFG considers riparian plant communities and freshwater marsh and seep communities in a generally arid climate to be sensitive habitat important to the species that depend on them. However, there are no wetlands or streams located on the Building 51 project site, and the site is located approximately 500 feet south of the head of the north fork of Strawberry Creek. Therefore, there is no potential for the project to affect any streams or other "waters of the United States" that would fall under the jurisdiction of the U.S. Army Corps of Engineers, and this topic will not be discussed in the impacts analysis.

Regulatory Environment

Federal Law, Regulations, and Policies

The primary federal agency responsible for managing fish and wildlife resources in the area of LBNL is the USFWS. The mission of the USFWS is to conserve, protect, and enhance the nation's fish and wildlife and their habitats for the continuing benefit of people. USFWS programs include management of wildlife sanctuaries, regulation of international and interstate commerce related to wildlife, management of migratory species that move between states, wildlife management research, and identification and protection of endangered species.

Federal Endangered Species Act

Under the Federal Endangered Species Act (FESA), the Secretary of the Interior and the Secretary of Commerce have joint authority to list a species as threatened or endangered (16 United States Code [USC] 1533[c]). Pursuant to the requirements of the FESA, an agency reviewing a proposed project within its jurisdiction must determine whether any federally listed or proposed species may be present in the project region, and whether the proposed project would result in a “take”⁶ of such species. The “take” provision of the FESA applies to actions that would result in injury, death, or harassment of a single member of a species protected under the act. In addition, the agency is required to determine whether the project is likely to jeopardize the continued existence of any species proposed to be listed under the FESA, or result in the destruction or adverse modification of critical habitat for such species (16 USC 1536[3][4]). Substantial, adverse project-related impacts to FESA-listed species or their habitats would be considered significant in this EIR.

Proposed species are granted limited protection under the FESA and must be addressed in Biological Assessments (under Section 7 of the FESA); proposed species otherwise have no protection from “take” under federal law, unless they are emergency-listed species. Candidate species are afforded no protection under the FESA. However, the USFWS recommends that candidate species and species proposed for listing also be considered in informal consultation during a project’s environmental review.

Migratory Bird Treaty Act and Bald Eagle Protection Act

The federal Migratory Bird Treaty Act (16 USC, Section 703, Supplement I, 1989) prohibits killing, possessing, or trading in migratory birds, except in accordance with regulations prescribed by the Secretary of the Interior. This act encompasses whole birds, parts of birds, and bird nests and eggs.

The federal Bald Eagle Protection Act prohibits persons within the United States (or other places subject to United States jurisdiction) from “possessing, selling, purchasing, offering to sell, transporting, exporting or importing any bald eagle or any golden eagle, alive or dead, or any part, nest or egg thereof.”

State Law, Regulations, and Policies

The primary state agency responsible for managing biological resources is the CDFG. The mandate of the CDFG is to manage California’s diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public. In particular, the CDFG is required under the various state statutes to conserve

⁶ “Take,” as applied in Section 9 of the FESA, means to “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect or to attempt to engage in any such conduct.” “Harass” is further defined by the USFWS (50 C.F.R. § 17.3) as an intentional or negligent act or omission that creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, and sheltering. “Harm” is defined as “an act which actually kills or injures wildlife.” This may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.

species through listing, habitat acquisition and protection, review of local land use planning, multi-species conservation planning, stewardship, recovery, research, and education.

California Endangered Species Act

Under the California Endangered Species Act (CESA), the CDFG has the responsibility for maintaining a list of threatened and endangered species (California Fish and Game Code Sec. 2070). The CDFG also maintains a list of “candidate species,” which are species formally noticed as being under review for addition to either the list of endangered species or the list of threatened species. In addition, the CDFG maintains lists of “species of special concern,” which serve as “watch lists.” Pursuant to the requirements of the CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any state-listed endangered or threatened species could be present on the project site and determine whether the proposed project could have a potentially significant impact on such species. In addition, the CDFG encourages informal consultation on any proposed project that may affect a candidate species.

California Fish and Game Code

The California Fish and Game Code provides a variety of protections for species that are not federally or state listed as threatened, endangered, or of special concern. These protections include the following:

- Section 3503 protects all breeding native bird species in California by prohibiting the take,⁷ possession, or needless destruction of nests and eggs of any bird, with the exception of non-native English sparrows and European starlings (Section 3801).
- Section 3503.5 protects all birds of prey (in the orders Falconiformes and Strigiformes) by prohibiting the take, possession, or killing of raptors and owls, their nests, and their eggs. As noted under “Special-Status Species,” above, birds included under this designation are considered “special-status species” in this EIR, in recognition of their relatively greater sensitivity, compared to other more common birds, to habitat loss and reproductive failure.
- Section 3513 prohibits the take or possession of migratory nongame birds as designated in the Migratory Bird Treaty Act or any parts of such birds except in accordance with regulations prescribed by the Secretary of the Interior.
- Section 3800 prohibits the taking of nongame birds, which are defined as birds occurring naturally in California that are not game birds or fully protected species.
- Section 3511 (birds), Section 5050 (reptiles and amphibians), and Section 4700 (mammals) designate certain wildlife species as fully protected in California.
- Section 1900 (California Native Plant Protection Act) preserves, protects and enhances endangered native plants in California. The act gave the California Fish and Game

⁷ “Take” in this context is defined in Section 86 of the California Fish and Game Code as to “hunt, pursue, catch, capture, or kill, or to attempt to hunt, pursue, catch, capture, or kill.”

Commission the power to designate native plants as endangered, threatened, or rare, and to require permits for collecting, transporting, or selling such plants.

Local Plans, Policies, and Ordinances

As a federal facility conducting work within the University of California's mission, LBNL is generally exempt under the federal and state constitutions from compliance with local requirements. However, LBNL seeks to cooperate with local jurisdictions to reduce the physical consequences of its activities to the extent feasible. This section summarizes relevant policies contained in the City of Berkeley General Plan as well as other City of Berkeley plans and ordinances relevant to biological resources at the project site.

City of Berkeley General Plan

City of Berkeley General Plan (2001) policies pertaining to natural resources that are relevant to implementation of the proposed project include the following:

- Policy EM-28 Natural Habitat: Restore and protect valuable, significant, or unique natural habitat areas.
- Policy EM-30 Native Plants: Use native tree and plant species to enhance ecological richness.
- Policy EM-31 Landscaping: Encourage drought-resistant, rodent-resistant, and fire-resistant plants to reduce water use, prevent soil erosion, improve habitat, reduce fire danger, and minimize degradation of natural resources.
- Policy EM-32 Inter-jurisdictional Coordination: Encourage efforts by neighboring jurisdictions and agencies, such as the East Bay Regional Parks District, University of California, Berkeley, and the Lawrence Berkeley National Laboratory, to restore historic coastal grasslands in the hill area to provide natural habitat and reduce fire danger in the area.

City of Berkeley Coast Live Oak Removal Ordinance

The Berkeley City Council adopted an ordinance declaring a moratorium on the removal of coast live oak trees within the city. Apart from LBNL's exempt status from this local regulation, this ordinance would not be applicable because no such trees would be removed as part of the project.

Impacts and Mitigation Measures

Significance Criteria

Evaluation of potential project impacts on the biological resources of the Building 51 project site and its surroundings requires analysis of the individual elements of the project and how introduction of those elements (separately or collectively) would affect the existing resources of the site.

In accordance with Appendix G of the state CEQA *Guidelines* and the UC CEQA Handbook, a project would have a significant effect on biological resources if it would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS;
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFG or USFWS;
- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
- Fundamentally conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance;
- Fundamentally conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan; or
- Exceed an applicable LRDP or Program EIR standard of significance.

Potential impacts of the project on special-status species were assessed based on the literature review, professional judgment, and the following criteria:

- 1) A determination of susceptibility. This determination is a three-level process that evaluated for each species: a) potential occurrence in the study area (generally, the terrestrial and aquatic habitats of the project site); b) potential occurrence within the project footprint; or, c) absence from either the study area or proposed construction sites. If the species was determined unlikely to be found in the study area, for example, if no potential habitat was found to exist for the species in the project vicinity, then the species was given no further consideration.
- 2) If a species was determined to have the potential to occur in the project study area, further analyses were made of life history and habitat requirements, as well as the suitability of habitat found within the project site or its vicinity for the species. The results of this determination for each species are provided in the Potential to Occur column of **Table IV.C-1**
- 3) If suitable habitat was determined present within the proposed project vicinity and the species has been documented as observed within the project area or has at least a moderate potential to occur, additional analysis considered whether the species would be adversely affected by the project. Both direct effects (e.g., displacement of habitat) and indirect

effects (e.g., noise) were considered. In addition, life history and habitat requirements were evaluated to ascertain the likelihood and severity of impact.

As discussed above, no sensitive natural communities, riparian habitat, or federally protected wetlands have been identified in the project site vicinity. The Initial Study (see Appendix A) found that the LBNL site is not subject to or designated for any adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved conservation plan. This EIR therefore does not discuss these issues further.

Measures Included as Part of the Project

The following impacts relevant to biological resources were anticipated and analyzed pursuant to CEQA as part of the programmatic 1987 LRDP EIR, as amended, from which the present analysis is tiered:

Impact III-D-1:	Continued University operation of LBNL, including continued implementation of the 1987 LRDP, is not expected to reduce the number or restrict the range of any rare, endangered, or threatened plant or animal species, or to cause existing fish or wildlife populations to drop below self-sustaining levels.
Impact III-D-2:	Continued University operation of LBNL, including continued implementation of the LRDP, will result in the loss of some vegetation, including potential loss of mature trees and areas with some habitat for non-critical species.
Cumulative Impacts:	No significant cumulative impacts on biological resources are expected.

As a result of anticipated impacts on biological resources, the following mitigation measures, adopted as part of the 1987 LRDP EIR, as amended, are already required for the proposed project, and are therefore incorporated, as necessary, as part of the proposed project's description:

Mitigation Measure III-D-2a:	Revegetation of disturbed areas, including slope stabilization sites, using native shrubs, trees, and grasses will be included as a part of all new projects.
Mitigation Measure III-D-2b:	Invasion of opportunistic colonizer trees and shrubs will be controlled. A maintenance program for controlling further establishment of eucalyptus, green wattle acacia, French broom, cotoneaster, and other opportunistic colonizer shrubs and trees in disturbed areas on-site will be undertaken. Herbicides will not be used for this purpose.
Mitigation Measure III-D-2c:	Removal of native trees and shrubs will be minimized. (To the greatest extent possible, the removal of large coast live oak, California bay, and Monterey pine trees will be avoided.)

This project-specific EIR examines several potential impacts (see below) that were not anticipated or analyzed in the 1987 LRDP EIR, as amended. These include potential direct disturbance of active nests of raptors and other special-status birds, potential indirect disturbance of these nesting birds and potential disturbance of maternity roosts of special-status bats during their breeding season.

Impacts

Impact IV.C-1: Noise and activities associated with demolition may indirectly disturb nesting special-status birds such that they abandon their nests or such that their reproductive efforts fail. (Less than Significant with Mitigation)

Since, with the exception of the two small areas of ornamental landscaping at the entrance to Building 51, demolition activities would include no tree or shrub removal or damage to trees, and the ornamental landscaping to be removed does not represent appropriate habitat, there would be no potential for direct adverse effects on nesting raptors and other special-status nesting birds. However, there are a number of oak and conifer trees in close proximity to Building 51 on the slopes to the east and south of the building. These trees are located in a relatively narrow strip of vegetation between two developed areas and alongside Lawrence Road, which has regular daytime traffic flow, including heavy diesel trucks and buses moving up the grade to McMillan Road. The trees nevertheless may provide nesting habitat for special-status passerine birds (relatively smaller, perching birds, including many songbirds) and raptors, including raptors protected under Fish & Game Code Section 3503.5. There are also many other trees within a 500-foot radius of the project site (see **Figure IV.C-1**), including oak, eucalyptus, and conifers, that are large enough to support nesting special-status raptors.

Some activities and noise generated by project demolition would have the potential to disturb any nesting raptors or other special-status nesting birds present in the trees adjacent to the project site. Such activities could result in the abandonment of special-status bird nests, eggs, or fledglings. The 1987 LRDP EIR, as amended, considered nesting red-tailed hawks and great horned owls, the two raptor species most likely to be found at LBNL, and found no nests for either species during the field survey for the 1992 SEIR; therefore no further analysis of this potential impact was conducted. However, more recent field surveys (ESA, 2005; ESA 2002a, 2002b, 2002c and ESA, 2003a, 2002b), local anecdotal reports, and habitat suitability suggest that the above-mentioned raptors, as well as Cooper's hawks, sharp-shinned hawks, and a number of other bird species of concern (see **Table IV.C-1**) should be considered potentially present and possibly using the area for nesting purposes.

The existing ambient noise level in the project area is generated most notably by vehicle traffic, especially diesel trucks and the Lab's shuttle bus fleet (also diesel-powered), which circulates the Lab at 10-minute intervals throughout the day, as well as automobiles and motorcycles. In particular, McMillan Road, which includes a steep incline at its closest proximity to Building 51 and thus promotes particularly loud vehicular engine noises, is closer to many of the trees of concern than most of the actual sources of project noise would be, as the roadway defines the

border of the tree area. Stationary sources, including heating, ventilating, and air-conditioning equipment associated with buildings, and other stationary equipment at the Lab, including pumps, generators, cooling towers, exhaust hoods, and machine shop equipment, also generate noise, as do current activities at the Building 51 site and immediate vicinity, which include laydown and vehicle storage space for LBNL's "riggers," crane operators, and construction crews for various projects at LBNL.

Noise measurements taken in July 2003 and January 2004 indicate that hourly average noise levels at locations measured nearest Building 51 range between 52 and 66 decibels (dBA, Leq⁸). Maximum noise levels measured were between 61 and 83 dBA, with the second highest reading (74 dBA) at Building 71, near the top of the McMillan Road grade, most likely the result of shuttle bus traffic on the hill.⁹

Less frequent but more noisy activity includes operation of a nearby two-megawatt diesel emergency power generator, located approximately 200 feet northwest of Building 51 and abutting the tree line. This generator is tested monthly for intervals of four hours or more, at which time it creates noise of up to 85 decibels at a distance of 50 feet. In addition, regular vegetation management is conducted in and around the trees near Building 51. This vegetation management includes use of equipment such as weed-whackers, leaf blowers, chippers, and chain saws.

As stated in Section IV.I, Noise, noise levels associated with typical construction and demolition equipment, other than the hoe-ram impact hammer, range from 74 to 77 dBA. The noise levels associated with simultaneous operation of multiple pieces of equipment other than this hammer is expected to reach 80 dBA, as measured at a distance of 50 feet from the source. With use of the hoe-ram hammer, which would be employed only during the removal of the foundation and substructure (a period expected to last for nine or 10 months), construction noise levels could be as high as 96 dBA at 50 feet. While much of the available research on noise effects on wildlife focuses on longer-term effects related to disturbance from recreational users and military operations (e.g., snowmobiles in national parks, military aircraft overflights in wilderness areas), this analysis conservatively assumes that disturbances from construction and demolition noise could potentially result in the abandonment of special-status bird nests, eggs, or fledglings present in the trees adjacent to the site.¹⁰ On one hand, one source reports, in terms of effects of continuous noise on bird communities, "An increase of 10 dBA above background noise is probably acceptable in most situations" (Nicholoff, 2003). On the other hand, a 10 dBA increase

⁸ Frequency A-weighting follows an international standard methodology of frequency de-emphasis and is typically applied to community noise measurements; Leq represents the constant sound level which would contain the same acoustic energy as the varying sound level.

⁹ All noise readings were based on measurements 15 minutes in duration.

¹⁰ In Ellis (1981), the observers recorded "noticeably alarmed" responses in raptors to sounds within the 82-114 dBA range. At comparable levels (72-89 dBA) seabirds flushed off nests (Jehl and Cooper 1980); at 115 dBA seabirds were absent for as long as 10 minutes (Stewart 1982). Though these studies did not always establish nest failure, the thresholds for a single stimulus event clearly had an effect. This information is indicative that nesting disruption may occur if the noises would persist over a longer period of time. More recent research has found certain types of unnatural noise to be disruptive to bird life at a much lower level. For example, Delaney et al. (1999) found that spotted owl flush rates in response to chain saws became undetectable only when noise levels dropped below 46 dBA.

in noise level is perceived by the human ear as a doubling in loudness, potentially causing an adverse response. Wildlife perception of noise appears to be generally more sensitive than that of humans; therefore, it is assumed for the purposes of this EIR that a 10 dBA increase in noise (a doubling of loudness) over the existing maximum levels should be considered to be material for birds, as well as other wild animals. Therefore, even assuming that the 83 dBA noise level (generated just south of Building 51, atop the hill inside the LBNL Blackberry Canyon entrance) is representative of typical intermittent bus and truck noise on McMillan Road, demolition-generated noise generated at 96 dBA from use of the hoe-ram impact hammer would represent a material increase over the highest existing noise levels in the area of the project site, and would be considered sufficient to cause a significant impact on nesting special-status birds. However, assuming that simultaneous operation of multiple pieces of more standard equipment (trucks, backhoes, graders, cranes, and the like, and not including the hoe-ram impact hammer) would not exceed 80 dBA and would not be continuous (i.e., an individual piece of construction equipment frequently operates for several minutes to an hour or two before stopping while equipment is repositioned, haul trucks depart, and so forth), such activities would not be considered sufficient to cause a significant impact on nesting special-status birds – that is, for most of the project timeframe, these potential noise impacts would be less than significant even without the incorporation of mitigation measures. Project activities would have the potential to cause a significant adverse noise or vibration impact to wildlife only during the demolition of the foundation and substructure stage, when the hoe-ram impact hammer would be used.

In addition to CEQA impacts, any removal or destruction of active nests and any killing of migratory birds would violate the federal Migratory Bird Treat Act and/or the California Fish and Game Code, Sections 3500-3516. (As noted, raptors protected by Fish and Game Code Section 3503.5 are considered special status species for the purposes of this EIR, and are therefore listed in **Table IV.C-1.**)

Regardless of the noise and demolition activity levels on the project site, there would be no adverse effect, and therefore no significant impact, if the project would not interfere with the successful nesting of raptors and other special-status birds. Demolition activities, including ground clearing and grading, that would occur during the non-breeding season (August 1 through January 31) would have no potential effect. For project activities that would commence during the breeding season (February 1 through July 31), the conduct of the avian surveys and the subsequent preventive actions would eliminate the potential for adverse effects to nesting special-status birds.

Mitigation: To address potential indirect adverse effects on nesting special-status birds, the following mitigation measure would be adopted:

Mitigation Measure IV.C-1: Pre-Demolition Special-Status Avian Survey and Subsequent Actions. No more than two weeks in advance of any demolition activity involving concrete breaking or similarly noisy or intrusive activities that will commence during the breeding season (February 1 through July 31), a qualified wildlife biologist shall conduct pre-demolition surveys of all potential special-status bird nesting habitat in the vicinity of the Building 51 project site and, depending on the survey findings, the

following actions shall be taken to avoid potential adverse effects on nesting special-status nesting birds:

1. If active nests of special-status birds are found during the surveys, a no-disturbance buffer zone will be created around active nests during the breeding season or until a qualified biologist determines that all young have fledged. The size of the buffer zones and types of construction activities restricted within them will be determined through consultation with the CDFG, taking into account factors such as the following:
 - a. Noise and human disturbance levels at the project site and the nesting site at the time of the survey and the noise and disturbance expected during the construction activity;
 - b. Distance and amount of vegetation or other screening between the project site and the nest; and
 - c. Sensitivity of individual nesting species and behaviors of the nesting birds.
2. If pre-demolition surveys indicate that no nests of special-status birds are present or that nests are inactive or potential habitat is unoccupied, no further mitigation is required.
3. Pre-demolition surveys are not required for demolition activities scheduled to occur during the non-breeding season (August 1 through January 31).
4. Noisy demolition activities as described above (or activities producing similar noise and activity levels in the vicinity) commencing during the non-breeding season and continuing into the breeding season do not require surveys (as it is assumed that any breeding birds taking up nests would be acclimated to project-related activities already under way). However, if trees and shrubs are to be removed during the breeding season, the trees and shrubs will be surveyed for nests prior to their removal, according to the survey and protective action guidelines 1a through 1c, above.
5. Nests initiated during demolition activities are presumed to be unaffected by the activity, and a buffer is not necessary.
6. Destruction of active nests of special-status birds and overt interference with nesting activities of special-status birds shall be prohibited.
7. The noise control procedures for maximum noise, equipment, and operations identified in Section IV.I of this EIR shall be implemented.
8. After consideration of LRDP Mitigation Measure III-D-2c, shrubs that have been determined to be unoccupied by special-status birds may be removed as long as they are located outside of any buffer zones established for active nests.

Level of Significance after Mitigation: Less than Significant

Impact IV.C-2: Noise and activities associated with demolition on the project site could indirectly cause roost abandonment and death of the young of special-status bats roosting in the trees immediately to the east and south of the project site. (Less than Significant with Mitigation)

The 1987 LRDP EIR, as amended, did not consider bats in its impacts analysis. However, the USFWS currently lists a number of bat species as species of federal concern (USFWS, 2005), due to nationwide declines in many bat populations. Special-status bats that may occur in the project vicinity include fringed myotis and long-eared myotis. Special-status bats may use crevices in exfoliating tree bark, as found in eucalyptus, and/or hollow cavities in trees, such the oaks and pines located in the vicinity of the proposed project site, as well as abandoned buildings. Myotis bats may use the oak woodland across Lawrence Road from the project site, the oak and bay woodlands at the head of the north fork of Strawberry Creek, or the various conifers, oaks, and eucalyptus located between Building 51 and McMillan and Lawrence roads. As discussed above for birds, particularly noisy activity associated with one stage of demolition could result in noise levels sufficiently high to cause significant adverse impacts on maternal roosts of special-status bat species. During other stages, assuming that simultaneous operation of multiple pieces of less noisy equipment would not exceed 80dBA and would not be continuous, such activities would not be considered sufficient to cause a significant impact on nesting special-status bats.

Regardless, there would be no adverse effect, and therefore no significant impact, if the project would not interfere with the successful roosting of the bats. Demolition activities that would occur during the non-breeding season (September 1 through February 28) would have no potential effect. For those project activities that would commence during the breeding season (March 1 through August 31), the conduct of bat surveys and the subsequent preventive actions would eliminate the adverse effects of the project.

Mitigation: To address potential indirect adverse effects on roosting special-status bats, the following mitigation measure would be adopted:

Mitigation Measure IV.C-2: Pre-Demolition Special-Status Bat Survey and Subsequent Actions. No more than two weeks in advance of any demolition activity involving concrete breaking or similarly noisy or intrusive activities, that will commence during the breeding season (March 1 through August 31), a qualified bat biologist, acceptable to the CDFG, shall conduct pre-demolition surveys of all potential special-status bat breeding habitat in the vicinity of the Building 51 project site.

Under such surveys, potentially suitable habitat shall be located visually. Bat emergence counts shall be made at dusk as the bats depart from any suitable habitat. In addition, an acoustic detector shall be used to determine any areas of bat activity. At least four nighttime emergence counts shall be undertaken on nights that are warm enough for bats to be active, as determined by a qualified bat biologist.

Depending on the survey findings, the following actions shall be taken to avoid potential adverse effects on breeding special-status bats:

1. If active roosts are identified during pre-demolition surveys, a no-disturbance buffer will be created, in consultation with the CDFG, around active roosts during the breeding season. The size of the buffer will take into account factors such as the following:
 - a. Noise and human disturbance levels at the project site and the roost site at the time of the survey and the noise and disturbance expected during the construction activity;
 - b. Distance and amount of vegetation or other screening between the project site and the roost; and
 - c. Sensitivity of individual nesting species and the behaviors of the bats.
2. If pre-demolition surveys indicate that no roosts of special-status bats are present, or that roosts are inactive or potential habitat is unoccupied, no further mitigation is required.
3. Pre-demolition surveys are not required for demolition activities scheduled to occur during the non-breeding season (September 1 through February 28).
4. Noisy demolition activities as described above (or activities producing similar noise and activity levels in the vicinity) commencing during the non-breeding season and continuing into the breeding season do not require surveys (as it is assumed that any bats taking up roosts would be acclimated to project-related activities already under way). However, if trees are to be removed during the breeding season, the trees would be surveyed for roosts prior to their removal, according to the survey and protective action guidelines 1a through 1c, above.
5. Bat roosts initiated during demolition activities are presumed to be unaffected by the activity, and a buffer is not necessary.
6. Destruction of roosts of special-status bats and overt interference with roosting activities of special-status bats shall be prohibited.
7. The noise control procedures for maximum noise, equipment, and operations identified in Section IV.I of this EIR shall be implemented.
8. After consideration of LRDP Mitigation Measure III-D-2c, shrubs that have been determined to be unoccupied by special-status bats and that are located outside the no-disturbance buffer for active roosts may be removed.

Level of Significance after Mitigation: Less than Significant

Impact IV.C-3: The proposed project could harm or temporarily disturb common wildlife species. (Less than Significant)

Proposed project activities could disturb common wildlife species that exist within the proposed project area, including black-tailed deer, raccoon, striped skunk, and gopher snakes. Animals within these habitats, such as small mammals and reptiles, could be subjected to noise and other human disturbances, as well as to direct mortality. Mortality of common wildlife is not considered significant under CEQA, nor is it expected to occur, particularly with regard to larger and more mobile species. It is expected that no habitat for common wildlife will be lost as a result of the proposed project. In fact, revegetation of the site after demolition will result in a short-term slight increase of open space and habitat for common wildlife. The proposed project would therefore result in a less-than-significant impact on common wildlife species.

Mitigation: None required

Impact IV.C-4: Demolition activities have low potential to disturb or result in mortality of special-status plant species or eliminate their habitat. (Less than Significant)

As noted above under "Setting," the potential for special-status plant species to occur on the project site is considered low. With the exception of a small landscaped area, the Building 51 site itself is devoid of vegetation. As the result of past and ongoing disturbance, as well as the introduction of highly competitive non-native species, vegetated areas adjacent to the site are not expected to support special-status plants. Finally, demolition activities are not expected to result in the removal of any potential habitat for special-status plants. Therefore, the proposed project would result in a less less-than-significant on special-status plants.

Mitigation: None required

Cumulative Impacts

Impact IV.C-5: The cumulative impacts of the proposed project combined with all other development projects in the area could potentially result in a substantial reduction in open space or wildlife habitat. (Less than Significant)

This section evaluates whether or not implementation of the Building 51 demolition project, in combination with other past, present, and reasonably foreseeable LBNL and non-LBNL projects, would result in significant cumulative impacts on biological resources. This analysis includes the impacts of cumulative growth resulting from implementation of the Berkeley and Oakland General Plans, other projects implemented under the 1987 LBNL LRDP, and development that will occur under the future updated LBNL LRDP. The cumulative context for analysis also includes the implementation of the UCB 2020 LRDP, as well as implementation of the East Bay Regional Park District's *Master Plan* (1996).

In this EIR, the geographic context for analysis of cumulative impacts on biological resources includes the areas encompassed by the LBNL LRDP; the UC Berkeley LRDP; the City of Berkeley hills neighborhoods; hills areas north of Claremont Canyon, included within the City of Oakland; and Tilden Regional Park, which is managed by the East Bay Regional Park District (EBRPD). These lands are contiguous and represent a continuum from relatively undisturbed wildlands to the wildland-urban interface to downtown urban land uses.

The standards of significance for cumulative biological resources impacts in this EIR are the same as those set forth for the impacts analysis earlier in this section.

The proposed project would result in a minor net benefit for biological resources, although this benefit is not expected to be permanent. Project impacts on biological resources are expected to be relatively minor and all impacts would be mitigated to less-than-significant levels as discussed above. There are currently no specific projects planned for the site and the project calls for revegetation after demolition is complete. Thus the project would result in a small increase of open space and potential wildlife habitat at LBNL. Other projects considered under the LBNL and UC Berkeley LRDPs, as well as development under the Berkeley and Oakland General Plans within the geographic context outlined above, and anticipated but uncertain future development that might occur at the project site, would cumulatively combine to reduce open space and available habitat. However, open space currently comprises a significant portion of the geographic context described above and the fractional amount of vacant space developed would be relatively small.

The magnitude of cumulative effects of development on biological resources is in large part determined by the extent to which resources are protected in plans and during specific project implementation. The 1987 LBNL LRDP and the 2020 UC Berkeley LRDP, as well as the East Bay Regional Park District *Master Plan* and the City of Berkeley General Plan, all contain policies and/or guidelines for protecting natural resources, including special-status species, sensitive natural communities, and jurisdictional waters. The proposed project and all development under the LBNL and UC Berkeley LRDPs, the City of Berkeley General Plan, and the East Bay Regional Park District *Master Plan* would also take place in a regulatory context of federal, state, and local laws designed to avoid and minimize impacts to special-status species, sensitive natural communities, jurisdictional waters, and wildlife migratory corridors and nurseries. The cumulative impacts of all development anticipated under these plans would not result in a substantial reduction in open space or wildlife habitat. Similarly, the proposed project would not make a considerable contribution to that overall cumulative biological impact. As a result, cumulative impacts to biological resources resulting from the proposed Building 51 demolition would be less than significant.

Please refer to the cumulative impacts discussion under Section IV.A, Aesthetics, for a discussion of the reasons why the cumulative effects of a potential future project of unknown purpose and size at the Building 51 site are expected to be less than significant.

Mitigation: None required.

Summary of Impacts and Mitigation Measures

As noted in the discussion above, under the 1987 LRDP EIR, as amended, and with the incorporation of the Mitigation Measures IV.C-1 and IV.C-2 (identified in this EIR), the proposed project would not exceed the standards of significance established for environmental effects related to biological resources. The proposed project would incorporate 1987 LRDP EIR, as amended, Mitigation Measures III-D-2a through III-D-2c.

Potentially significant impacts not mitigated by the 1987 LRDP EIR, as amended, would be reduced to less-than-significant levels by the incorporation of Building 51 demolition Mitigation Measures IV.C-1 and IV.C-2. As a result, the proposed project would result in no significant adverse impacts on biological resources.

Building 51 Demolition Project-Specific Mitigation Measures:

Mitigation Measure IV.C-1: Pre-Demolition Special-Status Avian Survey and Subsequent Actions (see discussion above for details).

Mitigation Measure IV.C-2: Pre-Demolition Special-Status Bat Survey and Subsequent Actions (see discussion above for details).

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- * Denotes reference used in Appendix B, Biological Resources Background Information.

D. Cultural Resources

Introduction

This chapter evaluates the potential impacts on cultural (historical and archaeological) resources that could result from the proposed demolition of Building 51 and the Bevatron.

A summary of site history is presented using information from technical studies prepared for the project area. These studies include archival research at the California Historical Resources Information System's Northwest Information Center (Northwest Information Center) (2003); a cultural resources evaluation and survey completed by Archaeological Research Services (1986); an archaeological survey report prepared by Butler International Corporation (1999); the first of a series of reports being prepared by David Harvey of the Pacific Northwest National Laboratory (PNNL) (1994) as part of an inventory and evaluation of potential historically significant buildings and structures at Berkeley Lab; and a historic architectural evaluation report of the Bevatron/Bevalac prepared by Marjorie Dobkin and Michael Corbett (1994). In addition, following the requirements of the National Historic Preservation Act (NHPA) and a Memorandum of Agreement among the Department of Energy (DOE), the California State Historical Preservation Officer (SHPO), and the Advisory Council on Historic Preservation, LBNL prepared a Historic American Engineering Record (HAER) report for the Bevatron (LBNL, 1997). The HAER report was accepted by the National Park Service (NPS) in March 1998.

Setting

Regional Context

The initial date for the prehistoric Native American occupation of Northern California is generally agreed to be about 2,000 B.C., at least in the San Francisco Bay region. Linguistic evidence suggests that the Native Americans that lived in the area spoke Chochenyo, one of the Costanoan¹ languages. In 1770, the Costanoan-speaking people lived in approximately 50 separate and politically autonomous nations or tribelets. Early Spanish diaries record a number of small villages along the foothills of the East Bay area. Ethnographic sources indicate that one settlement, named Huchiu-n, may have been situated in the general vicinity of the present site of the city of Berkeley (Kroeber, 1925). During the mission period, 1770-1835, the Costanoan people experienced cataclysmic changes in almost all areas of their life, particularly a massive decline in population due to introduced diseases and declining birth rate. Following the secularization of the missions by the Mexican government in the 1830s, most Native Americans gradually left the missions to work as manual laborers on the ranchos that were established in the surrounding areas. Native American archaeological sites in this portion of Alameda County tend

¹ "Costanoan" is derived from the Spanish word Costanos meaning "coast people." No native name of the Costanoan people as a whole existed in prehistoric times as the Costanoan were neither a single ethnic group nor a political entity.

to be situated along ridgetops, midslope terraces, alluvial flats, near ecotones,² and near sources of water including springs.

Local Setting

Past and Current Cultural Resource Surveys

As part of the environmental analysis for the 1987 LRDP EIR, as amended, all undeveloped land and proposed building locations were examined for potential historical and archaeological resources. All reasonably accessible parts of the LBNL area were examined. Special attention was given to areas of relatively flat land or rock outcrops. The steep hillsides were not examined intensively, although transects through accessible areas were made. The entire lab property was surveyed again in 2000 for the presence of potential archaeological and historical resources, including the project site. No indications of historic or prehistoric archaeological resources eligible for listing on the National Register of Historic Places (see “Regulatory Environment,” below) were encountered (Kielusiak, 2000).

The Northwest Information Center has indicated there is a “low potential for Native American sites in the project area” and thus “a low possibility of identifying Native American or historic-period archaeological deposits in the project area” (Northwest Information Center, 2003). As noted earlier, Native American archaeological sites in this portion of Alameda County tend to be situated on terraces along ridgetops, midslope terraces, alluvial flats, and near sources of water. The project site is not located on these types of terrain. It is located on a former slope that was mechanically terraced to construct the building, and it is not adjacent to Strawberry Creek, the primary source of water in the area. More importantly, the site was extensively graded and otherwise altered in order to construct Building 51. Therefore, there is a low potential for Native American sites to exist at the location of the proposed project.

In terms of historic buildings, field surveys and historic research is being conducted at LBNL by a team of licensed cultural resource professionals to evaluate the potential for historically significant buildings or structures. In coordination with LBNL, DOE, and the Office of Historic Preservation, this team is systematically investigating and reporting on all previously unsurveyed buildings and structures at the Lab. Upon completion, these reports will be submitted to SHPO for review and concurrence.

History of Building 51 and the Bevatron

Construction of Building 51 began in 1949, and the building was occupied in 1950. It was built according to the designs of the San Francisco architectural firm of Masten and Hurb. When the Bevatron began operating in 1954, it was the world’s largest and highest energy accelerator, designed for the study of high-energy nuclear processes of cosmic energy range. Additions and structural changes to Building 51 and modifications to the Bevatron continued until the closing of

² Ecotones are transition zones between adjacent ecological systems, having sets of characteristics uniquely defined by space and time scales and by the strength of interactions between them.

the latter in 1993. Building 51A, an addition to the Bevatron, was designed by the architectural firm of Milton T. Pflueger and occupied in 1958, with a small addition in 1961.

Several ancillary buildings also existed in the vicinity. The External Proton Beam Hall (Building 51B) was occupied in 1967, while smaller buildings were added at various times as the need for additional space arose. The buildings lacked common design features and unified building standards. All have been demolished and/or removed from the site. Also, since the shutdown of the Bevatron, various materials have been removed from Building 51, including some of the concrete shielding blocks and beamline components.

The Bevatron dominated the field of high-energy physics between 1954 and 1959, but by the late 1960s other facilities superseded the Bevatron, and it was projected that it would be shut down by 1974. Anticipating closure, the Bevatron was modified between 1971 and 1973 to create the Bevalac, which connected the Bevatron in Building 51 and the SuperHILAC in Building 71. This action changed the focus of research conducted at the facilities, and new areas of research arose from the Bevalac, including nuclear heavy-ion physics, medical research and therapy for cancer treatment, and cosmic ray experiments simulating conditions found in outer space. The Bevalac, housed in the Building 51 complex and Building 71, operated from 1974 until February 1993 when DOE suspended its operation.

Events of historic significance have involved the Bevatron, including the award of a number of Nobel Prizes. The first Nobel Prize for findings made at the Bevatron was awarded in 1957 to Tsung-Dao Lee and Chen Ning Yang for their theory of parity nonconservation. Although these scientists were not with LBNL, their theory was proved at the Bevatron. In 1959, a Nobel Prize was awarded to Berkeley Lab scientists Emilio Segre and Owen Chamberlain for their work at the Bevatron proving the existence of previously theorized antiprotons. A Nobel Prize was awarded in 1968 to Luis Alvarez for his contributions to elementary particle physics. Alvarez developed the technique of using the hydrogen bubble chamber and data analysis, which led to his discovery of the resonance particle. This may have been one of the most complex discoveries at the Bevatron. The last Nobel Prize related to the Bevatron was awarded in 1969, and like the 1957 Nobel Prize had an indirect connection to the Bevatron. The 1969 Nobel Prize was awarded to Murray Gell-Mann of Cal Tech on his theory of strangeness and the eightfold way. LBNL physicists discovered a new elementary particle that provided confirmation of the theory.

The Bevatron is associated with scientists credited with making significant discoveries in the field of physics. These scientists include Ernest Orlando Lawrence, Edwin McMillan, Emilio Segre, Owen Chamberlain, Luis Alvarez, Jose Alonso, Robert Birge, Eleanor Blakely, William Brobeck, Joseph Castro, Bruce Cork, Ben Feinberg, Albert Ghiorso, Donald Gow, Herman Grunder, Walter Hartsough, Paul Hernandez, Harry Heckman, Glenn Lamberston, Edward J. Lofgren, Sholi Nagamiya, Charles Naudet, Oreste Piccioni, Art Poskanzer, Wilson Powell, Howel Pugh, Lynn Stevenson, Reinhard Stock, James Symons, Hank Crawford, Isao Tanihata, Cornelius Tobias, George Trilling, William Wenzel, Clyde Wiegand, Gordon Wozniak, and Luciano Moretto.

Regulatory Environment

National Register of Historic Places

The National Register of Historic Places (NRHP or National Register) is the nation's master inventory of known historic resources. The NRHP is administered by the National Park Service and includes listings of buildings, structures, sites, objects, and districts that possess historic, architectural, engineering, archaeological, or cultural significance at the national, state, or local level. Properties are nominated to the National Register by the State Historic Preservation Officer of the state in which the property is located, by the Federal Preservation Officer for federally owned or controlled property, or by the Tribal Preservation Officer for tribally owned property. Generally, structures, sites, buildings, districts, or objects must be at least 50 years old or "exceptionally important" to be considered eligible for listing in the National Register as significant historic resources. The State Office of Historic Preservation (see below) assigned Building 51/51A a rating of "2S2," which is defined as an "individual property determined eligible for the NRHP by consensus through Section 106 process. Listed in the California Register" (SOHP, 2003).³

Although not specifically stated by State Office of Historic Preservation, it is assumed that both the structure of Building 51 and the Bevatron accelerator equipment within it form a single historic resource, since Building 51 was purposefully designed and built to house the Bevatron.⁴

State Office of Historic Preservation

The State Office of Historic Preservation maintains the California Register of Historical Resources, an authoritative listing of the state's significant historic resources as well as architectural, archaeological, and cultural resources. The California Register includes properties listed in or formally determined eligible for the National Register, pursuant to Section 4851(a) of the Public Resources Code, and lists selected California Registered Historical Landmarks. The State Office of Historic Preservation also maintains the *Directory of Properties in the Historic Property Data File*. Properties in the Property Data File are not protected or regulated.

The State Office of Historic Preservation sponsors the California Historical Resources Information System (CHRIS), a statewide system for managing information on the full range of historic resources identified in California. CHRIS is a cooperative partnership among the citizens of California, historic preservation professionals, 11 information centers, and various agencies (SOHP, 2003). CHRIS provides an integrated database that furnishes site-specific archaeological and historical resources information on known resources and surveys to government, institutions, and individuals. CHRIS also supplies a list of qualified consultants.

³ Section 106 of the National Historic Preservation Act is a consultation process which requires federal agencies to consult with the Advisory Council on Historic Preservation on federal actions which may affect a building or structure listed in, or eligible for listing in, the National Register of Historic Places.

⁴ Conversely, it is also reasonable to assume that neither the structure of Building 51, nor the Bevatron equipment, would by themselves retain sufficient integrity to remain eligible for the a National Register if either facility were removed or separated from one another. Therefore, it is assumed that both the structure and the equipment together form the historic resource.

California Native American Heritage Commission

The California Native American Heritage Commission (NAHC) is charged with the preservation and protection of Native American human remains, grave goods, and cultural resources in the State of California. The Commission consists of nine members appointed by the Governor. In accordance with Public Resources Code Section 5097.98 and CEQA Section 15064.5(d), lead agencies shall work with the NAHC when Native American human remains exist or are likely to exist within a project area, and must contact the NAHC in the event of accidental discovery of human remains during project construction. A records search at the NAHC sacred lands file revealed no Native American cultural resources in the immediate project area (NAHC, 2005).

City of Berkeley General Plan

As a federal facility conducting work within the University of California's mission, LBNL is generally exempt under the federal and state constitutions from compliance with local requirements. However, LBNL seeks to cooperate with local jurisdictions to reduce the physical consequences of its activities to the extent feasible.

The Urban Design and Preservation Element of the City of Berkeley General Plan contains policies relating to the development and preservation of cultural resources in the city. Urban Design and Preservation Element policies potentially pertaining to the proposed project are as follows:

- Policy UD-5 Architectural Features: Encourage, and where appropriate require, retention of ornaments and other architecturally interesting features in the course of seismic retrofit and other rehabilitation work.
- Policy UD-6 Adaptive Reuse: Encourage adaptive reuse of historically or architecturally interesting buildings in cases where the new use would be compatible with the structure itself and the surrounding area.
- Policy UD-10 The University of California: Strongly support actions by the University to maintain and retrofit its historic buildings, and strongly oppose any University projects that would diminish the historic character of the campus or off-campus historic buildings. (Also see Land Use Policies LU-36 and LU-37.).
- Policy UD-36 Information on Heritage: Promote, and encourage others to promote, understanding of Berkeley's built and cultural heritage, the benefits of conserving it, and how to sensitively do that.

Neither Building 51 nor any of the facilities at LBNL are listed as a City of Berkeley historical resource in the Urban Design and Preservation Element (City of Berkeley, 2002).

City of Berkeley Landmarks Preservation Ordinance

In addition to the Berkeley General Plan, the City also has a Landmarks Preservation Ordinance, adopted in 1974, that requires the City to establish a list of potential buildings that should be considered for landmark, historic district, or structure of merit status. The ordinance outlines procedures for designating properties to landmark status and review procedures for physical

changes to landmark buildings. A Landmarks Preservation Commission appointed by the City Council and city staff administers the ordinance. Buildings designated as landmarks or as structures of merit must meet criteria for consideration set forth in the Ordinance. The criteria consist of three levels of designation for historic buildings: properties of exceptional significance (landmarks), structures of merit, and properties that do not meet landmark criteria but are worthy of preservation as part of a neighborhood, block, or street front.

Impacts and Mitigation Measures

Significance Criteria

The impacts of the proposed demolition project on cultural resources would be considered significant if they would exceed the following standards of significance, in accordance with Appendix G of the CEQA Guidelines and the UC CEQA Handbook:

- Cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines Section 15064.5;
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5;
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature;
- Disturb any human remains, including those interred outside of formal cemeteries; or
- Exceed an applicable LRDP or Program EIR standard of significance.

The significance standards for the first and second bulleted impact criteria are further explained below.

Section 15064.5 of the CEQA Guidelines defines a “historical resource” as:

- (1) A resource listed in, or determined to be eligible by the State Historical Resources Commission for listing in, the California Register of Historical Resources.
- (2) A resource included in a local register of historical resources, as defined in Section 5020.1(k) of the Public Resources Code or identified as significant in a historical resource survey meeting the requirements of Section 5024.1(g) of the Public Resources Code, shall be presumed to be historically or culturally significant. Public agencies must treat any such resource as significant unless the preponderance of evidence demonstrates that it is not historically or culturally significant.
- (3) Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be a historical resource, provided the lead agency’s determination is supported by substantial evidence in light of the whole record.

Public Resources Code (PRC) Section 5020.1 and CEQA Guidelines Section 15064.5(b)(1) define a significant effect as one that would materially impair the significance of a historical resource. According to CEQA Guidelines Section 15064.5(b)(2), material impairment of a resource's historic significance could result if the project would:

- Demolish or materially alter in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its inclusion in, or eligibility for inclusion in, the California Register of Historic Resources;
- Demolish or materially alter in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources pursuant to local ordinance or resolution (PRC Section 5020.1[k]), or its identification in a historical resources survey meeting the requirements of PRC Section 5024.1(g) unless a preponderance of evidence establishes that the resource is not historically or culturally significant; or
- Demolish or materially alter in an adverse manner those physical characteristics of a resource that convey its historical significance and that justify its eligibility for its inclusion in the California Register, as determined by the lead agency.

Generally, a project that follows the Secretary of the Interior's guidelines will be considered mitigated to a less-than-significant level (CEQA Guidelines Section 15064.5(b)(3)).

CEQA Guidelines Section 15126.4(b)(2) states that, "In some circumstances, documentation of a historical resource, by way of historic narrative, photographs, or architectural drawings as mitigation for the effects of demolition of the resources will not mitigate the effects to a point where clearly no significant effect on the environment would occur." In such cases, the demolition or substantial alteration of a historical resource would remain a significant and unavoidable impact on the environment even after the historical documentation has been completed.

CEQA Guidelines Section 15064.5(c) applies to effects on archaeological sites. Effects on non-unique archaeological resources are not considered significant. Regarding unique archaeological resources, lead agencies may require that reasonable efforts be made to permit such resources to be preserved in place or left in an undisturbed state. To the extent that unique archaeological resources are not preserved in place or not left undisturbed, mitigation measures to protect such resources are required (PRC Section 21083.2(c)). Additionally, mitigation measures may be imposed to make provisions for archaeological sites accidentally discovered during construction. Generally, with the imposition of mitigation measures, effects on archaeological resources would be reduced to a less-than-significant level.

The Initial Study (see Appendix A) found that the proposed project would have no significant impact in regard to a unique paleontological resource or site or a unique geologic feature at LBNL. During the course of development at LBNL, extensive excavation for buildings and infrastructure has not revealed the presence of unique paleontological or geologic resources, and thus subsurface excavation associated with the removal of Building 51 would not affect such resources.

Measures Included as Part of the Project

The following impact relevant to cultural resources has been anticipated and analyzed pursuant to CEQA as part of the programmatic 1987 LRDP EIR, as amended, from which this analysis is tiered:

Impact III-E-1: Continued University operation of LBNL, including continued implementation of the 1987 LRDP, while resulting in removal of substandard buildings, is not expected to adversely impact any significant prehistoric, archaeological, or paleontological site, or any property of historic or cultural significance, other than the Laboratory itself.

As a result of anticipated impacts to cultural resources, the following mitigation measures, adopted as part of the 1987 LRDP EIR, as amended, are already required for the proposed project and are therefore incorporated as part of the proposed project's description:

Mitigation Measure III-E-1a: A photographic record will be made of all structures demolished as part of future projects.

Mitigation Measure III-E-1b: An individual well-versed in the history of science in the twentieth century will evaluate the significance of specific pieces of equipment that may be replaced due to obsolescence or a change in the vector of research.

Mitigation Measures III-E-1a and III-E-1b have already been completed for this project, in the form of the HAER documentation, which included an extensive photographic record, and a detailed historical report by present and former LBNL scientists and technical staff.

As well as the above requirements, the LBNL Facilities Design and Construction Procedures Manual requires project managers to do the following if an archaeological artifact or human skeletal remains are found:

If an archaeological artifact is discovered on site during construction, all activities within a 50 foot radius shall be halted and a qualified archaeologist shall be summoned within 24 hours to inspect the site. If the find is determined to be significant and to merit formal recording or data collection, adequate time and funding shall be devoted to salvage the material. Any archaeologically important data recovered during monitoring shall be cleaned, cataloged, and analyzed, with the results presented in a report of finding that meets professional standards.

In the event that human skeletal remains are uncovered during construction or ground-breaking activities, all work within a 50 foot radius shall immediately halt, and LBNL Security shall be contacted. LBNL Security shall contact the University of California Police Department to evaluate the remains to determine that no investigation of the cause of death is required. The Native American Heritage Commission (NAHC) will be

contacted within 24 hours if it is determined that the remains are Native American. The NAHC will then identify the person or persons it believes to be the most likely descendant from the deceased Native American, who in turn would make recommendations to LBNL for the appropriate means of treating or disposing of the human remains and any grave goods. (LBNL, 2005)

Impacts

Impact IV.D-1: The demolition of Building 51, including the Bevatron equipment within it, would cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines Section 15064.5. (Significant and Unavoidable)

As stated above, Building 51 was determined eligible for listing in the NRHP and has been listed in the California Register of Historical Resources. Therefore, the building is a historical resource as defined in Section 15064.5 of the CEQA Guidelines. Demolition of Building 51 would materially alter in an adverse manner those physical characteristics that convey its historical significance and that justify its inclusion in the California Register of Historical Resources. Therefore, demolition of Building 51 and the Bevatron equipment inside it would cause a significant impact on the environment.

The impact from the potential demolition of Building 51 would be reduced by the previously completed HAER documentation, which included a written historical and architectural description of the building and accelerator, and extensive photographic recordation. In addition, LBNL plans to commemorate the scientific achievements attributed to the Bevatron with a monument and/or a display listing the historic discoveries that occurred there. Finally, as stated in the Memorandum of Agreement among DOE, the California State Historic Preservation Officer, and the Advisory Council on Historic Preservation referenced earlier, with the acceptance of the HAER report by NPS, DOE may demolish Building 51 provided that DOE contacts the Historic American Building Survey (HABS) division of NPS to determine what level and kind of recordation is required for the buildings, and that such documentation is completed and accepted by HABS prior to demolition. LBNL has consulted with NPS. The latter determined that an addendum to the HAER report would meet HABS requirements. The addendum has been completed and is being reviewed by NPS. Demolition will not commence until NPS accepts the document.

Although these measures would reduce the impact on the historic resources, as stated earlier, CEQA Guidelines Section 15126.4(b)(2) provides that, under some circumstances, documentation of a historical resource will not mitigate the effects of the demolition of the resource to a less-than-significant level. For the purposes of conservative impact analysis under CEQA, this EIR concludes that the proposed demolition of Building 51 would result in a significant and unavoidable impact.

Significance after Mitigation: Significant and Unavoidable.

Impact IV.D-2: Implementation of the proposed project could cause a substantial adverse change in the significance of an as yet unknown archaeological resource and/or could disturb as yet unknown human remains. (Less than Significant)

As discussed previously, archival research, field work elsewhere at LBNL, and the nature of the project site itself all indicate that there is only a low potential for Native American sites to exist at the location of the proposed project. As described under “Measures Included as Part of the Project” above, the LBNL Facilities Design and Construction Manual specifies procedures for project managers to follow if an archaeological artifact is found.

Similarly, there is no indication that the site has been used for burial purposes in the recent or distant past. Thus, encountering human remains at the site during demolition activities would be unlikely. As described above, however, if human remains should be encountered during the project, the LBNL Facilities Design and Construction Manual specifies procedures to be followed.

As with any construction or demolition project at LBNL, these procedures from the LBNL Facilities Design and Construction Procedures Manual would be followed as part of the proposed project, and are therefore considered to be incorporated into the project. With implementation of these specifications, the project would result in a less-than-significant impact on archaeological resources and human remains.

Mitigation: None additional required.

Cumulative Impacts

Impact IV.D-3: None of the other proposed projects at LBNL, other projects at UC Berkeley, projects under the UC Berkeley 2020 LRDP, or potential buildout under the Berkeley General Plan would combine with the demolition of Building 51 to create a significant cumulative impact on cultural resources. (Less than Significant)

LBNL has retained Pacific Northwest National Laboratory to complete a series of reports to identify, survey, and evaluate approximately 245 buildings and structures at the LBNL site for potential eligibility for listing in the National Register. These studies have been undertaken pursuant to Section 110 of the National Historic Preservation Act, which requires that federal agencies such as DOE survey the lands under their control and evaluate all historic properties (including buildings and the equipment contained therein) for eligibility for listing in the National Register.

The PNNL series of reports is not yet complete, nor have the reports been submitted to the State Historic Preservation Officer for concurrence. Preliminary findings of the surveys and research conducted by PNNL suggest that Buildings 71 and 88 possibly are eligible for listing in the National Register (PNNL, no date). However, there are no current plans to alter Buildings 71 and

88. No other buildings or structures at LBNL have been identified as potentially eligible for listing in the National Register as part of this survey effort.

There are no projects planned as part of the UC Berkeley 2020 LRDP or UC Berkeley projects that would damage or destroy known archaeological or historical resources. As a result, these projects would not combine with the loss of Building 51 to create a significant cumulative impact on cultural resources.

Historic resources may be affected by infill development associated with implementation of the City of Berkeley General Plan. However, the Urban Design and Preservation Element of the City of Berkeley General Plan contains policies relating to the preservation of cultural resources in the city, as described above. These policies, in addition to the City's Landmarks Preservation Ordinance, are intended to protect cultural resources from encroaching development, and would not likely result in significant impacts on cultural resources. As a result, development under the City of Berkeley General Plan would not likely combine with the loss of Building 51 to form a significant cumulative impact on cultural resources.

One project approved by the City of Berkeley is the proposed demolition of the Blood House, a City of Berkeley Structure of Merit. Given that the Blood House, a small residential row house in downtown Berkeley, is a substantially different type of historic resource from the Bevatron, a large scale particle accelerator, the loss of the Blood House in addition to the potential loss of the Bevatron would not combine to create a significant cumulative impact on historic resources.

While the proposed project would not combine with other nearby projects to result in a significant cumulative impact on local historic resources, the buildings that house particle accelerators are of a rare type. Particle accelerators of this size exist in only three locations in the state: LBNL, Lawrence Livermore National Laboratory, and the Stanford Linear Accelerator Center. At these three locations, there are likely no more than seven total particle accelerators, including the Bevatron (Harvey, 2005).

However, these particle accelerators do not physically exist together as a group, as do buildings in a historic district, where the architecture of each building contributes to the overall physical and historic entity. Rather, particle accelerators are related only in an abstract way. The historic significance of the Bevatron, a scientific research device, and Building 51, the building that houses it, lies in the contributions to physics and knowledge in general that were made using the Bevatron; the importance of these activities to LBNL in furthering its overall research programs; and the Bevatron as an important milestone in the on-going development of particle accelerators for basic research. Thus, the demolition of the Bevatron and Building 51 would not contribute to the loss of a physical historic group or entity, and therefore, the demolition would not result in a cumulatively considerable impact on historic resources.

In summary, as discussed earlier, this EIR considers that the demolition of Building 51 and the Bevatron would create a significant impact under CEQA, but that demolition contributes little or nothing to any cumulative impact on historic resources. Although accelerators are a rare building type by virtue of their unique scientific requirements and construction expense, the other known

accelerators in the state are currently operational and do not appear to be threatened with potential demolition. This building type will continue to exist in other forms across the state, and as such, there is no adverse cumulative effect to which the demolition of Building 51 would contribute.

Please refer to the cumulative impacts discussion in Section IV.A, Aesthetics, for a discussion of the reasons why the cumulative effects of a potential future project of unknown purpose and size at the Building 51 site are expected to be less than significant.

Mitigation: None additional required.

Summary of Impacts and Mitigation Measures

The project has already incorporated 1987 LRDP EIR, as amended, Mitigation Measures III-E-1a and III-E-1b, in the form of HAER documentation, which included an extensive photographic record and a detailed historical report by present and former LBNL scientists and staff, and further HABS documentation also has been submitted to the National Park Service. However, for the purposes of conservative impact assessment under CEQA, the project would exceed applicable standards of significance related to a historical resource, and would therefore result in a significant and unavoidable impact.

Building 51 Demolition Project-Specific Mitigation Measures: None.

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